CLINICAL FEATURES OF PULMONARY EMBOLISM

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PULMONARY embolism with infarction is one of the commonest acute chest diseases met in hospital (Short 1952, Israel and Goldstein 1957). Confirmation of the diagnosis, however, is often difficult, and detection of pulmonary emboli depends upon the correct interpretation of symptoms, signs, electrocardiograms (E.C.G.s), and bedside radiographs.

This paper reports the clinical, electrocardiographic, and radiological findings in 72 patients with pulmonary embolism. The patients were all admitted to a controlled trial of anticoagulant therapy, the results of which have already been published (Barritt and Jordan 1960).

The conditions which preceded the attacks of pulmonary embolism were:

Fractures	15 (1 with carcinomatosis)
Abdominal and pelvic operations	22 (6 with carcinomas)
Other operations	5 (2 with carcinomas)
Heart-disease	15
Medical cases without heart-disease	8
Cases presenting with venous changes	7

Of the 72 patients, 5 apparently had the first symptoms of pulmonary embolism without having been confined to bed; of these 5, 2 were being investigated for mitral stenosis, 2 had evidence of thrombosis of the deep femoral vein, and the 5th had pulmonary embolism six weeks after Trendelenburg's operation for varicose veins. Another patient had a large pulmonary embolism the day after she had fallen and broken the neck of the femur. The remaining 66 were known to have been in bed for from two to thirty-five days before pulmonary embolism took place.

The onset of pulmonary embolism was often obvious from temperature chart. Characteristically, when, after a brief period of slight fever suggesting venous thrombosis, the patient was afebrile, the pulse-rate rose briskly. Fever followed within a few hours and often lasted for as long as a week. This sequence of events was particularly significant in postoperative patients, who were often febrile for a day or more after operation and had begun to recover when tachycardia and fever reappeared. If a patient was febrile continuously from the time of operation, a postoperative infection was suspected.

Symptoms

Symptoms following pulmonary embolism may be due to diminished cardiac output or to the development of infarction of the lung. The chief symptoms, related to a fall in blood-pressure, were:

Faintness	18 (16)
Substernal discomfort	12 (11)
Breathlessness without pleural pain	11 (11)
Pleural pain	58 (19)
Hæmoptysis	31 (9)

Number of patients with hypotension shown in parentheses.

Hypotension presumably indicates a fall in left ventricular output caused by massive embolism (Wood 1956). Faintness, substernal discomfort, and breathlessness (other than that due to pleurisy), suggest massive embolism. The substernal pain felt by these patients resembled that of myocardial ischæmia. There was no radiation to the shoulder and arm. In most patients the pain was less severe and less long-lasting than in myocardial infarction.

Pleural pain and hæmoptysis—the symptoms of pulmonary infarction—were accompanied by a fall in blood-pressure only when massive embolism had taken place. The hæmoptysis was sometimes no more than a speck of blood in a little sputum; at other times there was copious bloodstaining of the sputum for many days. It was never so profuse as to necessitate stopping anticoagulant therapy.

Physical Signs in the Cardiovascular System

Tachycardia.—Examination nearly always showed a rise in pulse-rate at the time of the first symptoms.

Arrhythmias.—Atrial fibrillation was present in 8 patients before pulmonary embolism. In 4 others fibrillation began after embolism and persisted for a few days. In a 5th patient its time of onset was uncertain. 1 patient had paroxysmal supraventricular tachycardia which reverted to normal rhythm after digoxin was given intravenously.

Venous pressure.—A rise in jugular venous pressure was the commonest sign of massive embolism. Inspection of the neck veins showed a clear rise in venous pressure in 31 patients. In 7 with congestive heart-failure, venous pressure was known to have been high before embolism took place. In some patients a worthwhile assessment of venous pressure could not be made, either because the neck veins could not easily be seen or because laboured breathing produced a large variation. Every patient who had a significant fall in blood-pressure showed an obvious rise in venous pressure.

Blood-pressure.—Evidence of a fall in systemic blood-pressure was found in 20 patients. In 15 of these, a systolic pressure of 100 mm. Hg or less (range 40–100 mm.) was recorded.

Heartsounds.—Auscultation of the heart was of little help in making the diagnosis. In 11 patients who did not have congestive heart-failure, gallop rhythm was heard. All had tachycardia. A loud pericardial friction sound was heard in 3 patients with massive pulmonary embolism. In all 3 the noise was first heard about twelve hours after the first symptom, was loudest in the pulmonary area or a little lower, to the left of the sternum, and lasted a few hours only.

Cyanosis.—Patients with massive embolism usually had a pale cold cyanotic skin. Under these circumstances, it was impossible clinically to be sure whether there was arterial oxygen desaturation.

Signs of Pulmonary Infarction

Breathlessness.—Characteristically, the breathing was rapid and shallow because of pleural pain. In addition, 11 patients were dyspnœic in the absence of pleural pain.

Rales.—Fine rales at the lung bases were heard in all but 8 of the 72. 2 of these 8 were patients with massive pulmonary embolism who did not have evidence of infarction. In 35 patients, the rales were bilateral, even though the pain was bilateral in only 5 of them. This suggests strongly that portions of the embolus enter both lungs in many cases, though there are symptoms of pulmonary infarction on one side only. Moreover, the

presence of rales may be the only evidence of involvement of a lung.

Friction.—Of the 58 patients with pleural pain, pleural friction was heard in 21. No patient had friction without pain, though 3 had friction on both sides but pain on one side only. The pleural friction lasted from a few hours to several days.

Dullness.—Loss of resonance to percussion at the lung base was a common sign, being found in 48 patients. It was usually due to elevation of the dome of the diaphragm, but the presence of fluid was proved by aspiration in 10. The effusion was bloodstained in 7, and clear in the other 3.

Bronchial breathing.—Harsh bronchial breathing with whispering pectoriloquy was not a feature of pulmonary embolism. It was heard in 2 patients who had massive pulmonary infarction with cavitation.

Signs in the Legs

The legs of all patients were carefully examined for œdema, tenderness of the calf or thigh, tender superficial veins, or varicose veins. The frequency with which these signs were found was:

Tenderness of calf on squeezing	32 (44%)
Œdema in the absence of heart-failure or renal disease	20 (28%)
Superficial thrombophlebitis	10 (14%)
Varicose veins	17 (24%)
Fractured legs in plaster	4 (6%)
No abnormal signs	16 (22%)

Electrocardiography

12-lead E.C.G.s were recorded in 61 of the 72 patients. As would be expected, the most obvious electrocardiographic changes were found in those who had a rise in venous pressure, a fall in systemic blood-pressure, and other features suggesting massive embolism. In those who showed no such evidence of circulatory changes the E.C.G. was often normal or unchanged.

Changes in Massive Embolism

The commonest electrocardiographic sign of massive embolism was inversion of T waves in certain leads. In 14 patients there was inversion of the T wave in leads V_1 and V_2. These were accompanied in 11 of the 14 by T wave inversion in leads II or III or aVF (fig. 1*a*, *b*, and *c*).

Right ventricular conduction delay (complete or incomplete right bundle-branch block), which later disappeared, was found in 4 patients. The evidence of right ventricular conduction delay was: (1) secondary RV1 1–5 mm.; (2) secondary RV6 2–3 mm.; (3) S_1 2–3 mm.; and (4) duration of S_1 0·06–0·09 sec. at the time of embolism, later shortening by at least 0·04 sec. In only 1 of the 4 patients was the duration of QRS in V_1 greater than 0·1 sec.

Of the 18 patients, 16 had a clear fall in blood-pressure and a rise in jugular venous pressure. The electrocardiographic changes appeared soon after the onset of symptoms, but in some cases there were more obvious abnormalities in later tracings. Reversion to normal was the rule within two weeks or less.

Positional Changes

Evidence of a positional change in the E.C.G. was found in 13 other patients. A conspicuous S wave in I, QR in aVR, S > R in V_6, and a QR or RS pattern in aVF were found in the first E.C.G. These changes later reverted, the heart assuming a less vertical position with less clockwise rotation.

In these 31 patients the E.C.G. strengthened the diagnosis.

Changes of Lesser Diagnostic Value

2 patients showed inversion of T_3 and T_{VF} without positional change or change in T_{V_2}. Inversion of T_3 alone was seen in 5 patients and a Q_3-T_3 pattern in 4 others. These changes were not sufficiently specific to add weight to the diagnosis. In 7 others, pre-existing electrocardiographic changes were present and no diagnostic help was obtained from the tracings. 1 patient with severe hypotension showed T-wave inversion in left ventricular leads for some hours.

Normal E.C.G.

In 12 patients the E.C.G. was normal. None of these 12 had a fall in blood-pressure. A rise in jugular venous pressure was noted in only 3.

Bedside Chest Radiograph

All but 1 patient had bedside chest radiographs. The view was taken that patients should not be moved to the department for 6 ft. films to be made, and consequently the quality of the films was sometimes poor. The difficulties were increased because the patients could not breathe deeply or hold their breath. Nevertheless, bedside films

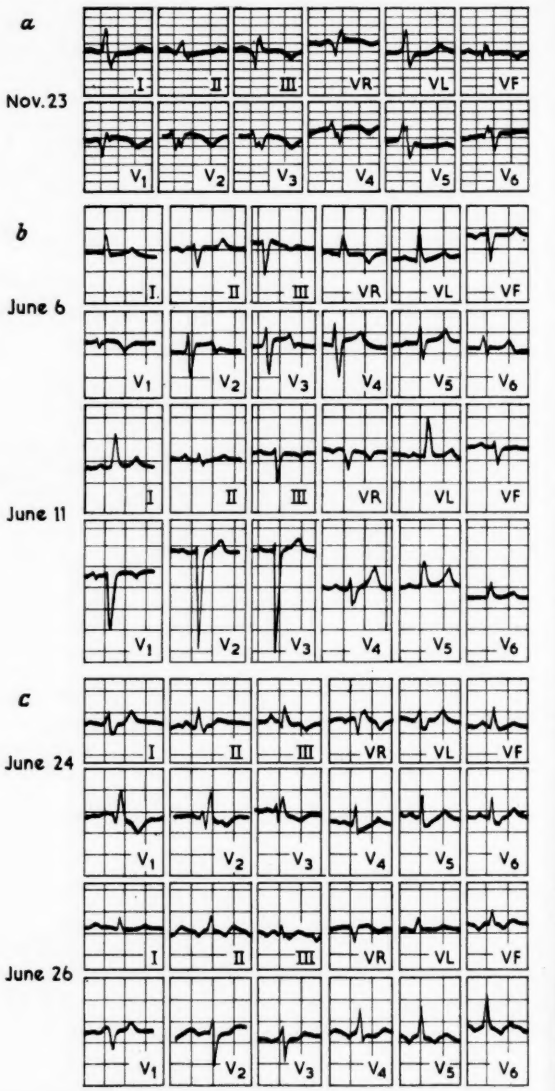

Fig. 1—Electrocardiograms showing:

(*a*) Q_3-T_3, Q_{VF}-T_{VF} pattern with clockwise rotation and T-wave inversion in V_1-V_4; (*b*) clockwise rotation with biphasic T waves in V_2-V_3 reverting to normal 5 days later; (*c*) temporary right bundle-branch block followed later by T-wave changes over left ventricle.

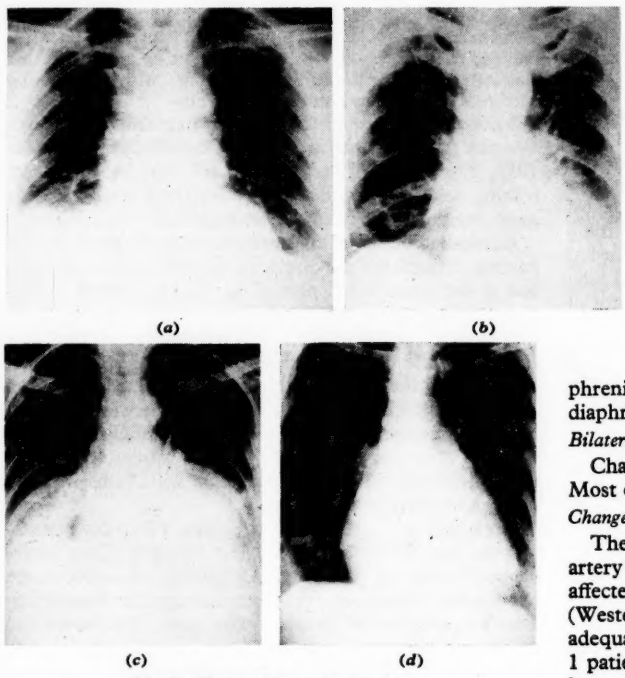

Fig. 2—Chest radiographs showing:
(*a*) Raised diaphragm with overlying lung shadow; (*b*) relative ischæmia of right lung; (*c*) extensive bilateral shadows with cavitation; (*d*) mitral stenosis with shadow of pulmonary infarct persisting for 4 months.

were most helpful, particularly in patients with evidence of acute cor pulmonale who did not have pleural pain. In these patients the distinction between embolism and myocardial infarction was sometimes difficult and the finding of a lung shadow strengthened the diagnosis of pulmonary embolism. The common radiological appearances of pulmonary infarction were described by Short (1951). The changes that we found most helpful in these films were elevation of the dome of the diaphragm, a shadow in the lower zone of the lung, and clouding of the costophrenic angle owing to a pleural reaction. Where there was diminished resonance at the lung base on physical examination, the dome of the diaphragm was nearly always raised.

Of the 71 patients who had radiographs taken, no changes could be detected in 16, either because the films were of too poor a quality or because no changes were present. In the remaining 45, even though films were often taken within an hour or two of the first symptoms, pulmonary infarction had given rise to a clear change in the chest radiograph.

Elevation of Dome of Diaphragm

The height of the two diaphragms was not precisely compared, but the right lobe was considered to be raised when more than 2 cm. higher than the left. In 8 patients a rise in the dome of the diaphragm was the only radiological evidence of infarction. In 29 others the diaphragm was raised but there was, in addition, clouding of the costophrenic angle or a shadow in the lung overlying the diaphragm (fig. 2*a*).

Clouding of Costophrenic Angle

Clouding of the costophrenic angle was taken to indicate a pleural reaction usually with a small effusion.

In many radiographs the angle could not be seen clearly, particularly in women; but evidence of a pleural reaction was common, being seen in 38 patients, all but 2 of whom had pleuritic pain on the side of the clouding. In 7 patients there was radiological evidence of a large pleural effusion and a diagnostic aspiration proved the presence of fluid in all of them.

Shadow in Overlying Lung

A shadow without clearly defined margins was often found, usually in association with a rise in the dome of the diaphragm. In patients with massive infarction the shadowing became extensive, and in 2 patients who died of pulmonary infarction cavitation was seen. In only 4 was there lung shadowing or clouding of the costophrenic angle without a change in the level of the diaphragm.

Bilateral Changes

Changes in both lung fields were seen in 16 patients. Most of them had pain on one side only.

Changes in Pulmonary Vascularity

The presence of large clots in the main pulmonary artery sometimes leads to diminution of vascularity in the affected lung, giving rise to the appearance of oligæmia (Westermark 1938). Bedside radiography is usually inadequate to show these changes sufficiently clearly. In 1 patient in the present series, however, oligæmia of one lung was so striking that the radiologist suggested thrombosis of one main pulmonary artery (fig. 2*b*).

Progress of X-ray changes

Progress films were usually taken at weekly intervals. At the end of the second week, unless there had been a recurrence, considerable improvement was usually seen.

Elevation of the diaphragm and clouding of the costophrenic angle usually disappeared. Shadows in the lung substance either resolved or became converted into linear scars, but sometimes the shadows persisted (fig. 2*c*). In 2 patients, who did not receive anticoagulant treatment and who died from massive pulmonary infarction, lung shadows progressively increased and showed areas of cavitation (fig. 2*d*).

Treatment and Clinical Progress

Of the 53 patients who were treated with an adequate anticoagulant regimen for two weeks, 1 died from acute renal failure, 1 had a recurrence of embolism during the period of treatment, 2 had recurrence of embolism four weeks after completing their course of treatment, and 2 died from carcinomatosis without evidence of further embolism. The prognosis in these 53 cases was, therefore, excellent as regards recurrence of embolism or persisting complications.

Discussion

Pulmonary embolism may take place in any patient who is confined to bed for some days. It is particularly common in those who have had abdominal or pelvic operations (Barker et al. 1940), in those with heart-disease (Carlotti et al. 1947, Byrne 1955), and in those with neoplasms (Trousseau 1877, Sproul 1938). Thrombophlebitis in the legs may develop in patients who have not been confined to bed, but these are the only patients who commonly have pulmonary embolism whilst ambulant. If pulmonary embolism is suspected in patients who are prone to the condition, ample clinical evidence will usually be found to confirm the diagnosis. The most difficult conditions to distinguish are the pneumonias—either lobar or inhalation

—and myocardial infarction. The distinction is clear when to the presence of evidence of a lung lesion are added a rise in venous pressure, a fall in systemic blood-pressure, triple heart rhythm, and the characteristic electrocardiographic changes of acute cor pulmonale. Pulmonary embolism and myocardial infarction can usually be distinguished electrocardiographically. Difficulties, however, sometimes arise, particularly if the patient is thought or is known to have had myocardial infarction earlier or to have previous cause for right ventricular hypertrophy. In these circumstances, evidence of pulmonary infarction is needed for a certain diagnosis. Pleural pain, dullness at the lung base, changes in the bedside radiograph, and evidence of venous thrombosis are usually conclusive.

Minor pulmonary infarctions may be difficult to diagnose. Transient pleural pain may be the only symptom, and there may be no abnormal physical signs. The chest X-ray is then the best hope of confirming the diagnosis of lung damage; and a rise in the diaphragm, a shadow, or clouding of the costophrenic angle, on the affected side strongly suggests pulmonary infarction. If the radiograph shows no changes, the diagnosis will remain in doubt. The risk of a second fatal embolism must be considered seriously before such an episode is dismissed as unimportant.

In almost half of this series, the E.C.G. was helpful in diagnosis. Murnaghan et al. (1943) described the changes in standard limb leads and one precordial lead in pulmonary embolism and found changes that were pathognomonic in a minority only. Some patients showed no changes at all, or else ones that were of no value in diagnosis. The pathognomonic changes in the limb leads were right-axis deviation with a prominent S_1, depressed ST segment in I and II, and Q_3 and inverted T_3. Cutforth and Oram (1958) considered that the most certain electrocardiographic evidence of pulmonary embolism was a combination of S_1, Q_3, T_3 plus right ventricular T-wave inversion, with or without right bundle-branch block in V_1. This pattern was found in 15 of our 72 patients, including all the most severe cases. These electrocardiographic changes, appearing acutely and resolving in a matter of days or weeks, are pathognomonic of pulmonary embolism. They are not to be expected unless there is clear clinical evidence of right-heart stress. In our experience, the E.C.G. cannot be expected to strengthen the diagnosis in about half the cases of pulmonary embolism.

Beside chest radiographs were often invaluable in confirming the diagnosis of pulmonary infarction. Basal rales may be caused by left ventricular failure or by bronchial infection, but a rise in the diaphragm and clouding of the costophrenic angle point to partial collapse of a segment of lung after embolism. The changes found within a few hours of the onset of symptoms have usually resolved before the patient leaves hospital.

There may be difficulty in distinguishing between pulmonary infarction and suppurative pneumonia which so often follows abdominal operations. After an operation pleural pain and hæmoptysis with clinical and radiological changes at the lung base suggest the diagnosis of pulmonary embolism. They may equally well be due to inhalation pneumonia. While the present investigation was being carried out this mistake was made twice early in the series.

Of 8 patients who died and came to necropsy, 2 were shown to have suppurative pneumonia, 1 after rupture of the œsophagus. Both mistakes could have been avoided if greater attention had been paid to the condition of the patients immediately after operation. Both had been unwell and febrile immediately after the operation. Both had very extensive radiological changes which should have led to revision of the diagnosis. Harsh bronchial breathing with whispering pectoriloquy was heard in these 2 patients.

Though many textbooks state that in pulmonary infarction the physical signs are those of consolidation (Brooks 1952, Coope 1951), we have found that the laryngeal sounds are rarely conducted to the chest wall with the same degree of clarity as in pneumonic consolidation.

Clinical evidence of involvement of the veins of the leg further strengthens the diagnosis of pulmonary embolism, but is not an essential part of it. In 16 patients in this series, examination of the legs showed no abnormality, and in 4 others examination was incomplete because of a plaster. Almost a quarter of this series of patients had obvious varicose veins. Furthermore, 14% had superficial thrombophlebitis. The belief that when there is superficial thrombophlebitis the risk of pulmonary embolism is small is still held by some clinicians. It is unjustified to feel that the patient is in no danger when superficial veins are hard and tender (Byrne 1955).

An earlier paper (Barritt and Jordan, 1960) gave details of anticoagulant treatment in these patients. Late recurrence of embolism took place in 2 patients, in one of whom the first embolism occurred immediately after Trendelenburg's operation for varicose veins, and in the other was associated with gross œdema of one leg. A longer course of therapy may be called for if recurrences are to be prevented in patients with severe complications in the leg. The veins never had to be ligated in any of these patients.

Summary

The symptoms of pulmonary embolism with infarction may include hypotension, faintness, substernal discomfort, breathlessness, pleural pain, and hæmoptysis. Pleural pain and hæmoptysis are only accompanied by hypotension when a massive embolism has taken place.

A rise in jugular venous pressure and a large fall in systemic blood-pressure are the commonest signs of massive embolism, and tachycardia nearly always accompanies the appearance of the first symptom. Auscultation of the heart is of little value in diagnosis.

The electrocardiogram (E.C.G.) may show characteristic changes—a combination of S_1, Q_3, T_3, and right ventricular T-wave inversion, with or without right bundle-branch block, in lead V_1. These changes are not seen unless there is clinical evidence of right-heart stress. In only about half the cases of pulmonary embolism is the E.C.G. of diagnostic value.

The bedside radiograph is helpful in confirming a lung lesion.

In a series of 72 patients, 2 with suppurative pneumonia were mistakenly thought to have an embolism.

Clinical evidence of thrombosis in leg veins was common; but in 16 patients, no abnormal signs were found. 14% of the patients had superficial thrombophlebitis and 24% had long-standing changes in the skin of the legs as a result of varicose veins.

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BENIGN MYALGIC ENCEPHALOMYELITIS IN NEWCASTLE UPON TYNE

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IN 1955 an obscure illness appeared among members of the medical, nursing, auxiliary medical, ancillary, and administrative staff of the Royal Free Hospital, London; it eventually affected 292 persons, and the clinical features of the illness have been described in detail (Medical Staff of the Royal Free Hospital 1957). The illness was at first believed to be an atypical variety of glandular fever, but later the condition was found to be an unusual variety of encephalomyelitis. The severity of the "Royal Free outbreak" drew attention to the fact that similar epidemics had been reported more and more often in recent years from many parts of the world including Iceland (Sigurdsson et al. 1950), Australia (Pellow 1951), the Middlesex Hospital, London (Acheson 1954), the United States (White and Burtch 1954, Poskanzer et al. 1957), Coventry (Macrae and Galpine 1954), and Durban (Alexander 1956, Hill et al. 1959). A further epidemic was reported in a nurses' training school in Athens (Daikos et al. 1959). The term "benign myalgic encephalomyelitis" was first applied to the condition in a leading article (*Lancet* 1956). In a comprehensive review, Acheson (1959) agrees that the term, though not wholly satisfactory, is preferable to other titles such as "Iceland disease" and "epidemic neuromyasthenia" which have been suggested. The present report describes a small epidemic in late 1959 in St. Mary's Training College for teachers in Newcastle upon Tyne.

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The Outbreak

The outbreak developed during October, November, and December, 1959. In St. Mary's College, 120 students between the ages of 18 and 21 are in residence. Also living in the same building are between 50 and 60 nuns; some of them teach, but many are completely segregated from the students. About 80 day-students and non-resident staff also work in the college. The illness was severe enough in 10 of the students to necessitate admission to the college sick-bay and 3 of these patients were later admitted to hospital. 2 members of the college staff were also affected; in one of these, a nun, aged 25, the illness was severe enough to require admission to hospital; but, in the other, a nursing sister, aged 29, who nursed many of the patients in the sick-bay, the condition was relatively mild and complete recovery took place in less than three weeks. 36 other students were probably mildly affected, but in these patients the illness was slight and transient and did not interrupt their studies for long.

The student who was probably responsible for introducing the illness to the college was one of the most severely affected. While on holiday in Lucerne she became ill on Sept. 8, 1959, with headache, vomiting, mild abdominal pain, and slight fever. Several other visitors and local inhabitants had a similar illness. She returned to St. Mary's College on Sept. 14, and almost immediately became ill again. The 2nd affected student, who was a close friend of the other, became ill on Oct. 1; and other cases, both mild and severe, followed in rapid succession.

Symptoms

Of the 48 cases in the outbreak, 26 were mild. These patients had only a mild and transient influenza-like illness lasting from three days to one week, with variable symptoms, including headache, limb pains, mild fever, abdominal pain, and diarrhœa; there were no neurological symptoms in this group. In 12 cases a moderately severe but monophasic illness occurred with headache, transient muscle pains, and weakness of the limbs, but they recovered completely within one to two weeks and there were no relapses. The illness was more severe, and there was clear evidence of nervous-system involvement, in 10 cases. The symptoms complained of by the patients in this group were:

Anorexia	10	Nausea and vomiting	7
Fever	10	Increased frequency of menstruation	6
Headache	10	Muscular pains	5
Insomnia	10	Diarrhœa	4
Abdominal pain	9	Backache	3
Excessive fatigue	9	Blurring of vision	2
Muscular weakness	9	Paræsthesiæ in limbs	2
Postural dizziness	8	Myoclonic jerking	1
Emotional lability	7		

Headache, fever, abdominal pain, and anorexia were usually the initial symptoms; and muscular pain, dizziness, muscular weakness, and emotional manifestations normally appeared within a few days. In 3 patients the muscular weakness was so striking that the students were seen staggering from side to side along the college corridors or dragging themselves along by the wall. These 3 girls were, at different times, quite unable to walk for several days in succession. Extreme fatigue was a characteristic feature, and 1 patient could not hold a glass to her lips for more than a second or two because of weakness of the arms. Often she would manage to take a few steps, but would then collapse and would have to be helped back to bed because of muscular weakness.

Extreme emotional lability was common; episodes of depression and of frequent crying, together with forgetfulness, impairment of concentration, and manifestations of overt anxiety were seen in almost all the patients. 1 patient (case 1) had several "hysterical" outbursts, in one of which there was clear-cut hyperventilation resulting in tetany and transient loss

of consciousness. Once, she was found to be producing false temperature readings by applying her clinical thermometer to a hot-water bottle.

Physical Examination

All patients showed emotional distress and anxiety, and, in some, behaviour was consistently hysterical for several days or sometimes weeks. The gait in the more severely affected patients was so bizarre that the impression of hysteria was heightened. In 6 there was a fine tremor of the outstretched hands, and 2 showed widespread muscular tenderness. There was no neck stiffness or objective evidence of cranial-nerve involvement in any patient. There was definite objective muscular weakness in 5 patients and in 2 of them it appeared to affect the upper and lower limbs asymmetrically. The type of weakness was characteristic: the power of contraction against resistance would be sustained for almost a second and then the strength would suddenly " give ", to be restored again a second or so later. This typical intermittency of muscular contraction against resistance was also seen in cases at the Royal Free Hospital. The deep tendon reflexes were unduly brisk in 3 patients, somewhat depressed in 3, and normal in the remaining 4 patients. plantar responses were flexor in all. No objective sensory abnormalities were noted in any patient, despite the persistence of subjective paræsthesiæ in 2.

No lymph-node enlargement, splenomegaly, or hepatomegaly was observed in any patient, and there were no objective abnormalities on clinical examination of any other system.

Case-histories

Case 1.—While on holiday in Lucerne the patient, aged 19, became ill on Sept. 8, 1959, with headache, vomiting, mild abdominal pain, and slight fever. She made a good recovery within two days and felt well on returning to her home in London next day. When she returned to college she became ill again with headache, low fever, and severe pains in the back, abdomen, and limb muscles, There was some aching and weakness of the legs. Pain in the back and tenderness in both renal angles was so severe that a urological surgeon was asked to see her and arranged her admission to the Newcastle General Hospital. Because of the weakness of the legs she was then seen by one of us (J. N. W.) who noted that despite this weakness there was no definite reflex change or sensory loss, and the patient's emotional over-reaction was such that a diagnosis of hysteria had to be considered. It seemed possible that she could have transverse myelitis, and hence a lumbar puncture was performed. This gave cerebrospinal fluid under normal pressure and of normal composition. Within two days the patient's fever and pain had resolved, she was walking relatively normally, and she was discharged from hospital one week later, apparently well, though rather nervous and tearful.

Within a week she had again relapsed, and there was a fever of up to 101°F, headache, blurred vision, and pain and aching in the back and limbs with profound weakness of the arms and legs, so that she could barely lift a cup to her lips. She also had at least three attacks of " hysterical " hyperventilation resulting in tetany, and was extremely depressed and tearful. Physical examination again revealed no abnormal neurological signs apart from the weakness which was seen to be curiously intermittent, in that a characteristic pattern of intermittent contraction, relaxation, and resistance, was observed. Gradually she improved in every respect and began to walk; but within a week her fever and difficulty in walking returned, and on this occasion she was found to be applying her clinical thermometer to a hot-water bottle. Her entire demeanour was intensely hysterical, and yet, according to the testimony of her family and friends, she had been a stable, well-adjusted, and unemotional girl before this illness. After several days there was again gradual improvement and the patient was discharged home. Once again she relapsed and was admitted to hospital. Intermittent episodes of fever, muscular weakness, intense fatigue and hysterical behaviour, unaccompanied by abnormal neurological signs, continued to take place during the ensuing six months; and nine months after the onset of the illness the patient, though improving steadily, was still tired very easily and continued to complain of some weakness in the legs. She returned to college in September, 1960, and was able to carry out routine duties and to attend lectures, but was still easily tired.

Case 2.—On Oct. 1, 1959, the patient, aged 20, had dull, aching upper abdominal pain, anorexia, low-grade fever, and frequent watery diarrhœa which lasted for a few days. For several days afterwards she continued to have vague epigastric pain after meals, her appetite was poor, and she slept badly at night. Three weeks after the onset of the illness sacral backache developed, together with a recrudescence of low fever; she became extremely tired and her legs felt heavy when she walked. Next day such severe bitemporal headache developed that she was unable to walk and was admitted to the college sick-bay.

She looked pale and vaguely unwell. The pulse-rate was 64 per minute, the temperature 99°F. The optic discs and fundi were normal and there was no neck stiffness. All four limbs, particularly the lower, were weak; voluntary contraction was ill-sustained and contraction against resistance showed a curious intermittency with a pattern of repetitive contraction and relaxation. After a few minutes of voluntary effort there was intense fatigue. All the tendon reflexes were brisk, the plantar responses were flexor, and there was no sensory loss. The patient was anxious, depressed, and intermittently tearful, but there were no other striking psychiatric manifestations. A full blood-count and differential white-cell count were normal, and normal cerebrospinal fluid was obtained on lumbar puncture. An electromyogram (E.M.G.) during voluntary contraction of both quadriceps and the right deltoid showed a curious grouping of motor-unit potentials; these " groups " were separated by brief silent periods.

The day after the E.M.G. was taken, the patient's fever abated but she could hardly move either leg, and the right arm was completely paralysed. Three days later she had repetitive and painful spasms of the erector spinæ muscles which gave intermittent and apparently involuntary arching of the back muscles, every one to two minutes. After three more days these spasms ceased spontaneously and the strength in the patient's limbs began to increase. She began to get up a little, but her gait was bizarre and she staggered along the corridor from wall to wall.

Over the next two weeks she gradually improved and resumed her classes, only to relapse with low-grade fever and severe muscular weakness and fatigue three days later. She was then sent home where fatigue continued to be troublesome and muscular weakness persisted intermittently for several weeks. Eventually, four months after the onset of the original illness, she was able to return to full-time studies and was symptom-free apart from mild intermittent fatigue.

Case 3.—In early November, 1959, the patient, aged 25, had a cold and when recovering from this she had a feeling of numbness and weakness in her legs which increased and caused her to go to bed. The next day she had photophobia and headache. She remained in bed for a fortnight, feeling weak and debilitated, after which she began to improve, sat up in a chair, and was beginning to walk when her legs again became weaker. Two days later they were so weak that she was admitted to Walkergate Hospital. Her arms tired easily, she felt nauseated, and headache was still present.

Early on the day of admission she was awakened by severe central abdominal pain and vomiting. The pain gradually subsided to a dull ache, though she continued to retch. She was extremely apprehensive and sweating, there was some tenderness in the right iliac fossa, but guarding was thought to be voluntary and, in fact, this subsided during the day.

Examination of the central nervous system showed only some indefinite weakness of the arms and considerably reduced

power in the legs with total inability to raise them from the bed. The tendon reflexes were all present and the plantar responses were flexor.

Her condition remained the same for about ten days and then showed some improvement, the right leg recovering more quickly than the left. Three weeks after admission she attempted to walk but her gait was bizarre and gave a powerful impression of hysteria. Slowly, however, she improved, and on leaving hospital her gait was much improved though slow, and climbing stairs was almost impossible. She now had exaggerated tendon reflexes, and movement tended to produce spasms of all lower-limb muscles. During her stay in hospital, liver-function tests were normal, the Paul-Bunnell test was negative, hæmoglobin 96% (13·8 g. per 100 ml.) leucocyte count 12,600 per c.mm., urine normal. Agglutination tests for typhoid and for abortus fever were negative. On Jan 25, 1960, the patient was discharged from hospital and sent home. After being at home for about two weeks she was admitted in relapse to a hospital in Liverpool.

Epidemiology

The community in which this outbreak took place was a teachers' training college offering a two-year course to girls who had just left school. There were about 100 girls in each of the academic years; they came from many parts of England and from Ireland.

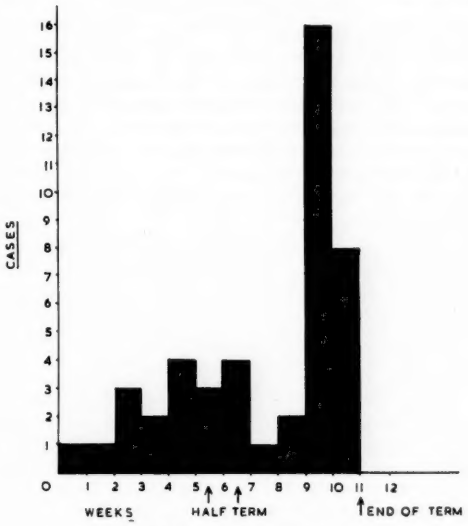
The outbreak took place in the autumn of 1959 after one of the longest and hottest summers in living memory. There was no increase in the incidence of communicable diseases in the area before the outbreak.

The term for second-year students began two weeks earlier than that for first-year scholars and this period was spent in teaching practice in local schools. As the first 3 cases of illness were in second-year students, before the first-year students arrived, some anxiety was felt about the schoolchildren who were presumably exposed to infection in this period. No cases, however, were reported among the schoolchildren.

The college is next to a nunnery and is administered by the nuns, who take part in duties, such as teaching and cooking, concerned with the college. There were about 50 nuns and they were assisted by 25 staff who slept out, but took lunch in the college. There were, therefore, some 275 persons including students, nuns, and staff who were at risk throughout the period of the epidemic. There were 48 cases (25 first-year students, 21 second-year students, and 2 nuns, 1 of whom taught, and the other nursed the students). 10 of the patients were severely ill, 12 were moderately ill, and the remaining 26 cases were so mild that had it not been for the existence of the severe cases these "abortive infections" would probably not have been diagnosed.

The communal life of these girls made an estimate of the probable incubation period difficult. No cases were known outside the college and contacts inside the college were so frequent and so intimate that no time intervals between cases were discernible. The first 3 patients were second-year students and of these the first 2 became ill before the first-year students started their term. The 3rd case appeared when all the students had assembled. The 4th definite case was a first-year student, who became ill nine days after her arrival so that this length of time might be regarded as the incubation period. Because abortive cases were probably common at that time, the actual incubation period could have been much less than nine days. This period was probably the maximum possible.

Cases continued to appear at intervals over a period of eleven weeks, the longest interval between cases being



Weekly onset of new cases.

eight days. An attempt was made to trace the path of the disease through the community and a table plan was made showing where each student sat in the dining-room. The cases were widely distributed between the tables, no particular group of girls being severely affected. In fact, each of the nineteen tables (with one exception) had at least 1 case; five tables had more than 2 cases, four of them having 4 cases and the fifth, 5. The girls taken ill at each of the tables were not affected at the same time. From these facts it appears that in the dining-room at least, cases arose in a completely random fashion.

A similar chart was made to show the sleeping accommodation which consisted of single rooms arranged along both sides of five corridors. Cases appeared in these corridors haphazardly, no relation apparently existing between neighbours or their use of bathrooms and lavatories.

Finally, the girls' names were grouped according to their friendships and again an attempt was made to detect any evidence of spread within groups. There was no indication that there was such a spread.

Another puzzling feature was that the outbreak was confined to students and 2 nuns, and that apparently none of the non-resident staff or any males in the college were affected.

The college was closed two weeks early for the Christmas vacation and no new cases appeared either when the students reassembled in January, or afterwards.

This is shown in the figure which also illustrates a decrease in the incidence of new cases seven to fourteen days after half-term.

Electromyography

E.M.G.s were taken with concentric-needle electrodes in 3 patients; muscles which showed obvious clinical weakness were examined. No spontaneous activity was recorded but, on volition, there was a characteristic grouping of motor-unit activity, with brief silent intervals between groups of two or three motor-unit potentials. This finding, which corresponds with the "intermittency" of muscular contraction observed clinically, is identical with the findings reported by Richardson (1956) in cases from the Royal Free Hospital.

Laboratory Investigations

11 patients, including all those considered to be seriously affected, were investigated. Only 4, however, were seen in the acute stage of the illness, the remaining 7 being at different stages of recovery when first examined. In spite of this, two specimens of sera were taken from all 11 patients at intervals of about sixteen days between the two collections, and the second specimen was therefore treated as a convalescent serum. Throat-swabs and fæces were also examined.

Serological tests.—All sera were screened by the complement-fixation test against the antigens of influenza A, B, and C, psittacosis/lymphogranuloma venereum, *Rickettsia burneti*, adenovirus group, mumps (virus-particle antigen), Sendai, lymphocytic choriomeningitis, and poliomyelitis types I, II, and III.

In addition, the sera were examined for agglutinins against the enteric group of bacteria and *Brucella abortus*, and antibodies to *Leptospira icterohæmorrhagiæ* and *Lepto-canicola*. In a few cases the Wassermann test was done, and two sera were examined for toxoplasma antibodies. The Paul-Bunnell test was done on all specimens.

Isolations.—Throat-swabs, immersed in Hanks' basic salt solution containing antibiotics and frozen immediately, were examined on tissue-culture media for virus isolation. The tissues employed included monkey-kidney cells, HeLa cells, and eleven-day-old fertile hens' eggs. Fæces were examined on a similar range of tissues, and were also inoculated intracerebrally into suckling mice. Cultures for bacteria were done.

Hæmatological and biochemical investigations.—Full blood-counts were made and a hæmatologists' opinion was sought on the blood-films. Liver-function tests were done.

Cerebrospinal fluid.—Only three specimens of cerebrospinal fluid were available for examination and these were from the severest cases which were admitted to hospital in the acute phase of illness. In addition to the usual routine examinations for cells and protein-content of the fluid, bacterial and virus isolations were attempted.

Results

From these investigations no positive assistance was obtained in the diagnosis of the illness and no pathogenic agent was identified.

The complement fixation-test showed that 3 of the girls had had a recent attack of influenza A and 1 an attack of influenza B. 1 girl had a positive agglutination test to *Br. abortus* to a titre of 1/50.

The Paul-Bunnell test was negative in all patients, as were all the other serological tests. No virus was isolated and no pathogenic bacteria were cultured.

Hæmatological studies were unhelpful except for the hæmatologist's opinion that a number of large lymphocytes in the blood smears from 3 of the patients were atypical, showing basophilic staining in the cytoplasm. No true glandular-fever cells were observed and the differential white-cell counts were normal.

Two specimens of cerebrospinal fluid were normal; the third was reported as containing 10 cells per c.mm. with a protein level of 10 mg. per 100 ml. No bacteria or viruses were isolated from these specimens.

Treatment

Treatment was purely symptomatic. Simple analgesics were required for the relief of muscular pain and headache, and many patients who had insomnia during the illness needed a simple sedative at night. Many isolated cases were treated initially with various antibiotics, but there is nothing to suggest that any of the treatment given had any significant effect upon the course of the disease.

Clinical Course

Though many of the mildly affected patients in this series made a complete and permanent recovery from the illness within a few days of the onset, the condition of the more seriously affected patients showed the characteristic frequent remission and relapse which has been described in previous outbreaks. After a few days in bed, muscular weakness would often clear up remarkably and the patient would become more calm, cheerful, and relaxed. On getting up, however, there would be a recrudescence of fever, with, in a day or two, a return of depression and emotional lability, and of extreme muscular weakness with severe fatiguability of the muscles. 3 patients who were sent home to other parts of the country were admitted to hospital as suspected cases of poliomyelitis, though their own doctors were told the nature of the illness. Nevertheless, in all but 3 cases, recovery from the illness appeared to be complete and final within four months of the onset. The remaining 3 patients, each of whom had had numerous remissions and relapses, still showed residual muscular weakness and an excessive tendency to fatigue, when re-examined six to eight months after the onset of the illness. 1 of these patients, after being ill for over four months, returned to college to complete her course and to take her qualifying examination, but during the examination she repeatedly dropped her pen from muscular fatigue, and was eventually sent home on a stretcher.

Discussion

The pattern of the illness in this small series corresponds closely to that described in previous reports. The epidemic took place in a closed community and affected exclusively young women. No male contacts had the disease, and, to the best of our knowledge, the illness did not affect any members of the general population in the areas near to the college, nor did it affect other members of the patients' families. The condition followed the now-familiar pattern of initial headache, fever, and abdominal or muscular pain followed by pronounced muscular weakness with emotional lability and, in the more severe cases, a long remitting and relapsing course. Striking muscular fatigue, and a gross disproportion between the severity of the weakness and the abnormality of gait on the one hand and the comparative lack of objective neurological signs on the other, were characteristic. The emotional upset in several of the patients was so severe that if they had been seen in isolation it would have been difficult at first to accept that they had any organic disease and that they were not hysterical.

It is not, therefore, surprising that sporadic cases of this condition are commonly overlooked or misdiagnosed; and the condition should be borne in mind in any patient suffering from a relapsing illness characterised by muscular weakness and by emotional lability.

In common with other workers, we have not been successful in isolating a virus from blood and other specimens obtained from the patients in our series. All the available evidence suggests that the condition must be infective in origin, but this supposition at present lacks positive confirmation.

Summary

At the end of 1959 there was a small outbreak of benign myalgic encephalomyelitis in a girls' training college in Newcastle upon Tyne. 46 out of about 200 students in the college were affected and 2 of the resident staff. 26 cases were mild, and, in the absence of a known outbreak, would probably have remained undiagnosed. 10 of the students had a severe illness with signs of nervous-system involvement.

The signs and symptoms were those observed in other outbreaks—initial headache, fever, myalgia, muscular

weakness, and emotional lability. In the severe cases the course of the disease was lengthy with repeated remissions and relapses. Muscular fatigue on slight exertion and gross disproportion between the severity of muscular weakness and incoordination on the one hand and objective neurological signs on the other are characteristic of the disease. Emotional upset was sometimes so great as to suggest hysteria.

No virus was isolated and no pathogenic bacteria could be cultured despite extensive virological and bacteriological investigations.

Treatment was purely symptomatic. Antibiotics were of no value.

The cases occurred in a completely random fashion. No males were affected. All available evidence suggests that benign myalgic encephalomyelitis is an infection but this cannot be confirmed at present.

We wish to thank Sister M. Grumitt, who nursed most of the invalids, for her invaluable help. We are also grateful to Dr. R. C. M. Pearson, medical officer of health for Newcastle upon Tyne, and to his staff for their collaboration during the course of the outbreak.

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MYALGIC ENCEPHALOMYELITIS

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SO-CALLED "benign encephalomyelitis" generally arises in well-defined epidemics. Isolated cases are sometimes suspected, but are usually mild and in the absence of pathognomonic signs defy definite diagnosis. The two cases described here had no connection with any other known cases or with any well-defined virus illness, but the disease was unusually severe. Both patients had respiratory failure and in case 1 there were signs of myocarditis.

Case-reports

Case 1.—A woman, aged 37, with no relevant history of previous illness.

On June 22, 1958, she had been feverish and had complained of a severe vertex headache, but she continued at work despite desperate tiredness and generalised aches and pains. On June 28 the headache became right frontoparietal and was associated with very slight photophobia and nausea. These symptoms persisted, and she remained in bed until her admission to hospital on June 30.

She was flushed, febrile, and uncooperative. Hyperæmia of the fauces and moderate enlargement of the posterior cervical lymph-nodes were noted. There was considerable neck stiffness and moderate back stiffness. The pupils reacted sluggishly to light. There was weakness of the right arm and leg with gross hypotonia, but the tendon reflexes were intact. The patient's mood varied from efforts at cooperation, hindered by slow comprehension, to confusion, lack of interest, and drowsiness. Her level of awareness gradually became clearer, and pyrexia subsided. The neck and back stiffness then became more severe and she had a generalised muscle tenderness, associated with intermittent spasm of muscle groups. The weakness and hypotonia of her right arm became profound, but the tendon reflexes could still be elicited.

Two weeks after admission the patient had tachypnœa with shallow irregular respirations, and she had diaphragmatic and intercostal weakness; a cabinet respirator was needed for four days. At this time she had anosmia, dysarthria, and clonic eye movements. The pupils were irregular and reacted sluggishly to light and accommodation. In the limbs there was a generalised weakness with hypotonia, greatest on the right. Such movements as were present were jerky and uncoordinated, and all tendon reflexes were diminished. During this phase of the illness, examination of the cerebrospinal fluid (C.S.F.) and hæmatological and biochemical investigations did not show any significant abnormality. Serum complement-fixation tests for viruses were negative, and no cytopathogenic agents were isolated from the stools.

From the fourth week of the illness her clinical state fluctuated; the muscle tenderness and spasm varied in intensity, and her weakness gradually became less. Her confusion had cleared, but she had violent swings of mood. At times she was completely withdrawn. This trying state of affairs lasted for eight weeks.

On Sept. 4 the patient had a persistent tachycardia of 100–110 per minute and the jugular venous pressure was raised. An electrocardiogram (E.C.G.) taken on Aug. 22 had been within normal limits, but on Sept. 5 there were low-voltage T waves in leads I and II and T-wave inversion in V_3 with low T-waves in V_{4-7}. Electrocardiography on Sept. 12 showed flat T waves in V_3 and V_4, but on Sept. 23 and Oct. 21 the pattern was normal apart from residual T-wave depression in lead V_4. The tachycardia persisted for two-and-a-half weeks.

During the tenth week of her illness her mental state underwent a rapid and striking improvement, and this coincided with a speeding up of the recovery of her motor system. On Oct. 14 electromyography of the left tibialis anterior showed grouping of the motor potentials on minimal volition. The residual motor-unit potentials were polyphasic and long lasting. An electroencephalogram (E.E.G.) was also abnormal because, superimposed on a basic α-rhythm of 12 c.p.s., there were generalised fast low-voltage waves at 18–28 c.p.s. (β_2-activity).

On Nov. 11 the patient returned home and continued treatment as an outpatient. At that time she had a useful degree of function in the upper limbs, but there was still a proximal weakness, and a considerable weakness of both legs. The weakness fluctuated rapidly and produced a curious jerky voluntary movement which was most pronounced against resistance. The patient complained of difficulty in initiating movement and the muscles tired rapidly. The muscles were hypotonic with normal reflexes; muscle spasm of variable intensity was still present in the hip adductors.

During the next ten months she continued her gradual recovery and eventually she was able to walk about a quarter of a mile with a bizarre shuffling gait.

In August, 1959, she had a severe upper-respiratory-tract infection, and a week later muscle spasm and pain recurred in her thighs. This spasm and pain gradually involved both legs and her right arm, and became associated with weakness. The patient could not be persuaded to enter hospital until three weeks later on Aug. 25 when she was almost completely incapacitated by a profound weakness of all her limbs. She was depressed, withdrawn, and paranoid. She was treated with imipramine ('Tofranil') 25 mg. three times daily, which resulted in a rapid and remarkable improvement in her mental state.

Within five weeks of admission the patient had recovered sufficiently to go home. Since then she has improved gradually, apart from minor relapses; and, at the time of writing, though tiring easily and walking with a limp, her mental state is normal and she has returned to part-time teaching.

Case 2.—A girl, aged 20, with no history of previous illness. On Jan. 18, 1959, she had a sore throat and an irritating

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harsh cough. Three days later she awoke with a severe pressing pain in the back of her neck and had aching and soreness in her muscles. On Jan. 22 she noticed weakness of her left arm and leg, and on that day she was admitted to hospital. She was slightly euphoric, and very slight enlargement and tenderness of the posterior cervical lymph-nodes was discovered. She had moderate back and neck stiffness and there was some weakness in her left arm and leg with diminished tone; the reflexes were intact. Hæmatological and biochemical investigations were negative, and the C.S.F. was normal. No viruses were isolated from stools, C.S.F., or throat washings; serum complement-fixation tests were inconclusive. During the next twenty-four hours she became confused and euphoric. Left facial weakness and profound weakness of her left arm and leg developed.

On Jan. 26 she complained of severe muscle pain and tenderness; the power in her left arm and leg began to improve, but there was difficulty in initiating movement and, when tested against resistance, the muscle power was ill sustained and came in short bursts giving an impression of clonus. The muscles tired rapidly.

On Jan. 30 she began to suffer from curious episodes of weakness followed by muscle spasm. A typical attack would occur at any time; she would experience a frontal headache and nausea, followed during the next two hours by an increasing loss of power in her legs spreading to her arms, trunk, and face. Tonus was diminished but the deep reflexes remained intact. Respiration would become rapid and irregular, with a tidal air of less than 100 c.cm. Clonic eye movements and ophthalmoplegia were also noted. Within half an hour a violent shivering would ensue which was associated with the return of some voluntary movement; this would rapidly be superseded by severe muscle spasm of the extremities. The muscle spasm would persist up to two hours. Serum-electrolytes, taken during these episodes, were normal.

By Feb. 15 the patient was having attacks of increasing severity, once or twice daily, with prolonged periods of respiratory distress, and she was transferred to an 'Alligator' respirator. Synchronisation was obtained with the help of promazine and pethidine at 16 respirations per minute with pressures of -7 to $+4$ cm. H_2O. These low pressures contributed little to the tidal volume, but seemed to assist respiration by establishing a regular rhythm. On Feb. 20 the patient was weaned from the alligator respirator to a Bragg-Paul belt, and at this time muscle weakness was less severe and the episodes of muscle spasm shorter. During the next three months she continued to improve but suffered minor setbacks, usually as a result of emotional upsets. During the recovery phase new symptoms came to light suggestive of autonomic involvement, with hyperhidrosis, nausea, flushing, and attacks of vertigo.

On Jan. 26 an E.E.G. showed infrequent episodes of epileptic activity lasting two seconds, consisting of fast high-voltage waves in both hemispheres. On July 15 the E.E.G. recording was normal.

Four months after admission she returned home and at this time had very slight left arm and leg weakness which was accentuated by fatigue; she still retained some jerkiness of movement on volition. There was one relapse in June, 1959, when the weakness and spasm recurred but less severely. Eighteen months after the onset of the illness she is still easily fatigued and her family notice some emotional lability, but formal examination reveals no disability.

Discussion

These two patients had illnesses which, in pattern and natural history, resembled those in the Royal Free Hospital group outbreak of encephalomyelitis (Medical Staff of the Royal Free Hospital 1957) and the Durban epidemic of myalgic encephalomyelopathy (Hill et al. 1959).

Both patients had a trivial upper-respiratory-tract infection, followed some days later by a clouding of consciousness and the appearance of disseminated nervous-system signs. Emotional lability, fatigue, and a tendency to minor phasic relapses were noted during convalescence. This course is characteristic of acute disseminated encephalomyelitis and conforms to the diagnostic criteria suggested by McAlpine (1931) and Miller and Evans (1953).

During the earlier phase of the illness there was muscle involvement concurrent with the pattern of encephalomyelitis and both patients showed severe muscle tenderness, myalgia, and, later, muscle spasm. The myocardial lesion in case 1 was possibly a manifestation of the muscle disorder.

Further deviation from the usual concept of acute disseminated encephalomyelitis was a predominence of motor signs, paresis with retention of deep reflexes, and very slight changes in the E.E.G. The difficulty in initiating movement with the unusual tremor on volition and rapid fatigue of the muscles involved, was described in both the Royal Free Hospital and Durban epidemics and was regarded as pathognomonic of the condition. The observation that the deep-tendon reflexes were retained during paresis seems important since it points to a midbrain lesion. This was seen dramatically in the second patient who had transient attacks of quadriparesis with intact reflexes and suggests an analogy with the drop attacks described by Kremer (1958). The respiratory dysrhythmia which, judging by the low respirator pressures required, was central in origin again points to a midbrain involvement.

The term "myalgic encephalomyelitis" appears to fit the symptom complex described satisfactorily; the prefix epidemic is omitted because it suggests that sporadic cases either do not arise or else are rare. This illness is probably commoner than is usually realised and mild sporadic cases may easily be labelled as hysteria, glandular fever, or myalgia. The difficulty in initiating movement and the characteristic tremor on volition would appear to be pathognomonic, and an encephalomyelitic illness with emotional disturbance and coincident myalgia and muscle spasm should lead one to suspect this disease.

Summary

Benign myalgic encephalitis is usually epidemic, but isolated mild cases, which are hard to diagnose with certainty, may be met. Two patients, who had no contact with any known case of myalgic encephalitis or with any other well-defined virus illness, had severe attacks of the disease.

Both patients had trivial upper-respiratory-tract infections, which were followed by clouding of consciousness and disseminated nervous-system signs. Both had to be treated in a respirator for respiratory dysrhythmia. During convalescence they were emotionally labile, tired easily, and had repeated minor relapses.

Myalgic encephalitis differs from acute disseminated encephalomyelitis in causing paresis with retention of the deep reflexes, and in showing very slight electroencephalographic changes. Pathognomonic features are the difficulty in initiating movement, with unusual tremor on volition, and rapid fatigue of the muscles involved.

This illness is probably commoner than is generally realised, and may be mistaken for hysteria, glandular fever, or myalgia.

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EFFECTS OF ETHYL ARACHIDONATE, COD-LIVER OIL, AND CORN OIL ON THE PLASMA-CHOLESTEROL LEVEL

A Comparison in Normal Volunteers

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IT is now well established that, when certain fatty acids or oils are taken by mouth, the level of the free and esterified cholesterol in the plasma falls. Both fish oils (such as menhaden and pilchard) composed mainly of highly unsaturated but "non-essential" acids, and vegetable oils (such as corn and safflower) which contain high proportions of the biologically essential linoleic acid (Hilditch 1956), have been reported as hypocholesterolæmic agents (Ahrens et al. 1955, 1959).

In regard to this action of the fatty acids two hypotheses have emerged: (1) that it is exerted through the total unsaturation (number of double bonds); and (2) that it is exerted only by those acids whose unsaturation derives from double bonds of a type and position in the molecule which cannot be synthesised by animals but which are essential to health.

The experiments reported here were undertaken to compare the effects of representatives of both types of oils (cod-liver and corn), and also of both types of acids (the pentaenes and hexaenes from cod-liver oil and the biologically essential arachidonic acid). Both oils were moderately unsaturated and both acids highly unsaturated, but the former oil and acid have a low "essential activity" while the latter have a high "essential activity" (Thomasson 1953).

The Oils

The *corn oil* contained 47% linoleic acid and had an iodine value of 115. It was fed as a powder formed by spray-drying an emulsion of 50% corn oil and 50% skimmed milk.*

The *cod-liver oil* contained 9% of pentaenes and 7% of hexaenes, and had an iodine value of 150. It was given in a specially refined, virtually tasteless and colourless form.†

* Pritchitt & Co., Uxbridge, Middlesex.
† British Cod Liver Oils (Hull and Grimsby) Ltd.

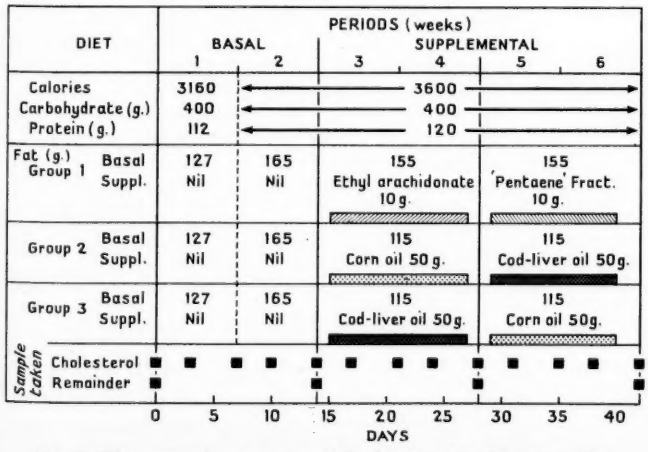

Fig. 1—Diagrammatic summary of the basal and supplementa diets.

The "*pentaene*" fraction contained 26% of pentaenes and 17% of hexaenes with an iodine value of 315.‡

The *synthetic arachidonic* acid was over 98% pure and was fed as the ethyl ester. Its iodine value was 303.§

The Investigation

Eleven healthy male medical students, aged 19–25, were placed on a diet of 3155 calories daily with 127 g. of mixed animal and dairy fat. This reduced their plasma-cholesterol level by about 10 mg. per 100 ml. within two or three days. As there was no further reduction within a week, the diets were changed to one of 3649 calories with 169 g. of fat per day. On this diet the students felt that the total diet and amount of fat were similar to their normal intake. Their plasma-cholesterol rose until their original levels were reached in about a week. At this point the fat under investigation was substituted for an equivalent amount of the daily fat as follows:

TABLE I—PLASMA-CHOLESTEROL LEVELS (mg. PER 100 ml.) OF EIGHT VOLUNTEERS RECEIVING A CONTROLLED DIET

	Basal diet	First supplement: Arachidonate	Second supplement: "Pentaene"
Group I:			
A	186 176 176 178 186	182 166 156 170	149 152 145 176
B	178 168 168 172 178	172 164 150 166	140 140 135 165
Average	182 172 172 175 184	177 165 153 168	144 146 140 171
	Basal	Corn Oil	Cod-liver Oil
Group II:			
C	225 200 215 200 221	210 200 180 198	200 180 160 218
D	220 195 196 218 224	206 200 170 176	200 175 155 180
E	170 172 165 175 168	158 154 153 154	150 145 130 165
Average	205 189 197 198 204	191 185 168 176	183 167 148 188
	Basal	Cod-liver Oil	Corn oil
Group III:			
F	233 220 228 220 232	198 204 176 200	176 154 155 208
G	185 178 185 182 194	173 168 162 156	152 156 149 160
H	143 138 140 140 146	135 130 128 128	124 116 119 120
Average	187 178 184 181 191	169 167 155 161	151 142 144 163

Group I (two students) received for eleven days 10 g.daily of ethyl arachidonate. At the end of fourteen days they were given 10 g. of a highly unsaturated "pentaene" fraction prepared from cod-liver oil.

Group II (three students) received for twelve days 50 g. daily of corn oil. After fourteen days they were given 50 g. daily of cod-liver oil.

Group III (three students) received the same supplement as group II, but in the reverse order.

Unfortunately there was insufficient material to reverse the order of group I feeding.

Subjects with high-normal and low-normal cholesterol levels were chosen for groups II and III; but in group I, because of the scarcity of ethyl arachidonate and because we were not sure of the effect of small daily quantities on the plasma-cholesterol, two volunteers with medium-normal levels were used.

The diets are summarised in fig. 1. The students' weight did not change while taking them.

Analyses

Samples of plasma were prepared from citrated blood collected by venepuncture on the days shown in fig. 1. Total plasma-cholesterol was measured according to Henley (1958).

As table I shows, in all the groups the cholesterol levels fell; this fall was greater than any during the basal period, and sharp rises took place when the oil supplements were discontinued. The falls in cholesterol level caused by the supplements, calculated

‡ 'Ethive', British Cod Liver Oils (Hull and Grimsby) Ltd.
§ Roche Products Ltd.

TABLE II—CHANGES IN THE PLASMA-CHOLESTEROL LEVELS OF EIGHT VOLUNTEERS RECEIVING A CONTROLLED DIET

Group	Volunteers	Initial plasma-cholesterol (mg. per 100 ml.)	Plasma-cholesterol changes (mg. per 100 ml.)				
			At end of first supplement		At end of second supplement		Total fall
			Starting-height	Fall	Starting-height	Fall	
I	A	186	156	−30	145	−11	−41
	B	178	150	−28	135	−15	−43
II	C	221	180	−41	160	−20	−61
	D	224	170	−54	155	−15	−69
	E	168	153	−15	130	−23	−38
III	F	232	176	−46	155	−21	−67
	G	194	162	−32	145	−13	−45
	H	146	128	−18	109	− 9	−27

as the difference between the level in the last plasma sample taken while still receiving the supplement and the level at the beginning of the period, are shown in table II.

It can be seen that in each group the fall was proportional to the starting-height of the cholesterol so that presupplemental levels of between 221 and 232 mg. per 100 ml. fell by 61 to 69 mg. per 100 ml., presupplemental levels between 178 and 194 mg. per 100 ml. fell by 43 to 49 mg. per 100 ml., while the low starting heights of 146 and 168 mg. per 100 ml. fell by 37 and 38 mg. per 100 ml., irrespective of the type of the supplements or the order in which they were fed.

If allowance was made for the relation between the cholesterol fall and its starting-height by expressing the cholesterol levels as percentages of the starting-height taken as 100%, then each of the supplements caused falls of 20–25% in the cholesterol level. This is shown in fig. 2, which gives the mean percentage levels of each group throughout the experiment.

The falls in the cholesterol levels were not arithmetically proportional to the starting-heights; for those with lower levels were affected less (group II, E; group III, H) and those with higher levels more (group II, C and D; group III, F) than would be expected on a strict percentage basis. Nevertheless, the results showed that the supplements caused roughly equal falls in the plasma-cholesterol, the level of which rose again immediately the supplements were discontinued.

The effectiveness of so low a daily dose of the "biologically essential" ethyl arachidonate (10 g. per day) raised the question of how small a quantity of the "non-essential" acids in cod-liver oil would effectively reduce the plasma-cholesterol level.

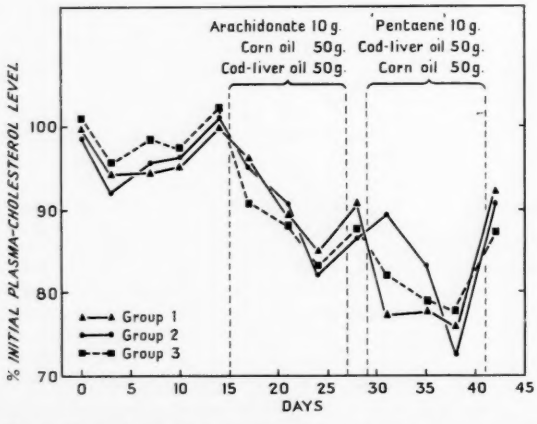

Fig. 2—Mean plasma-cholesterol level of each group as percentage of starting-height (taken as 100%).

Accordingly, in a separate experiment we tried the effect of 25–30 g. and 12–15 g. cod-liver oil—i.e., half and a quarter of the dose given previously. These doses were taken by two separate groups of three normal student volunteers for four weeks. Their meals were not specially prepared, but they all received the same kind of diet without particular omissions or excesses. The analyses were performed as before and samples taken once a week.

The lower dose of 15 g. (one tablespoonful) of cod-liver oil produced small and inconsistent falls of about 17 mg. per 100 ml. The higher dose of two tablespoonfuls, however, produced in four weeks reductions in the plasma-cholesterol level of between 31 and 59 mg. per 100 ml. Table III shows that the effect of the 25/30 g. daily dose was slower than that of the 50 g. in the previous experiment, but it was pronounced after four weeks of feeding.

As the effect of 15 g. was inconsistent, we concluded that the minimum amount of this oil which would produce definite changes in the plasma-cholesterol level was about 20 g. per day

Finally, 25–30 g. daily (two tablespoonfuls) of corn oil was fed to two healthy volunteers. The oil was the same as that from which the corn-oil powder was prepared.

TABLE III—PLASMA-CHOLESTEROL LEVELS (mg. PER 100 ml.) OF VOLUNTEERS RECEIVING UNCONTROLLED DIETS

Dose of oil (tablespoonfuls per day)	Volunteers	Starting-height	Week				Fall
			1	2	3	4	
Cod-liver: 1	I	233	227	229	218	191	−42
	J	255	250	249	252	254	− 1
	K	148	149	146	138	140	− 8
	Average	212	208	208	203	195	−17
Cod-liver: 2	L	241	234	219	213	192	−49
	M	285	278	274	268	254	−31
	N	237	225	210	187	178	−59
	Average	254	246	234	223	208	−46
Corn: 2	O	250	249	245	231	229	−21
	P	268	263	268	248	240	−28
	Average	259	256	256	239	234	−25

Table III shows that the plasma-cholesterol levels of each fell by about 25 mg. per 100 ml. Though little difference was observed between the effects of cod-liver and corn oils when 50–60 g. daily were given, in doses of 25–30 g. per day the cod-liver oil reduced the plasma-cholesterol levels of the volunteers more than did an equal amount of corn oil.

Discussion

In these experiments cod-liver oil reduced the plasma-cholesterol level at least as much as an equal weight of corn oil. Similar results were reported for another fish oil (menhaden) by Ahrens et al. (1959).

The meaning of the terms used must be further considered before our results can be discussed.

"*Unsaturation*"

If it is suggested that fatty acids or their mixtures act simply because of the number of double bonds they contain, then isomers of, say, linoleic acid with their double bonds in either the *trans* or the conjugated form and æleostearic acid with its three double bonds which are either together or conjugated should, by definition, also reduce the plasma-cholesterol level. It has been reported, however, that in rats (Hegsted et al. 1957) and in short-term feeding experiments in man (Kingsbury et al. 1960) that tung oil (containing approximately 80% of æleostearic acid) increases the plasma-cholesterol level. Thus, other factors besides total unsaturation are probably involved.

This objection may not be valid if, because of the ease of oxidation and polymerisation of æleostearic acid, the acid is changed before or during absorption and so is not in its original

polyunsaturated form when it reaches the metabolic sites responsible for the cholesterol effects. At the moment there is no evidence of this, so on present data there seems to be at least one exception to the total-unsaturation hypotheses.

If, therefore, the activity is not due simply to total unsaturation then the type or position of the double bonds must be important.

" *Biologically Essential* "

Fish oils contain fatty acids able not only to reduce plasma-cholesterol but also to reverse the high triene values in the tissues (Privett et al. 1959, Rieckehoff et al. 1949, Dam et al. 1959), and to maintain growth (Privett et al. 1959) in animals deficient in an essential fatty acid (linoleic). The fatty acids of fish oils, however, do not seem able to reverse the skin lesions of animals deficient in linoleic acid and so cannot substitute for all the biological effects of linoleic acid, or for those of its metabolic product, arachidonic acid (Privett et al. 1959). On the other hand, linoleic acid, as far as is known, can substitute for all the biological effects of the fish-oil acids. Thus we believe that the term " essential " should be restricted to those acids which are necessary for the complete health of animals and for which there are no adequate substitutes. This particular definition may exclude the fatty acids of fish oils from the " essential " class.

With these definitions it seems fair to say that our experiments have shown that the plasma-cholesterol of normal volunteers on a strictly controlled " normal " diet can be reduced by the essential acids in corn oil, and also, at least to the same extent, by the non-essential acids in cod-liver oil. Thus the present evidence would support the " unsaturation " hypothesis, except for the effects of æleostearic acid. The effect of this conjugated acid (which reacts differently from the non-conjugated acids), implies that not only unsaturation but correct position of double bonds is necessary for the hypocholesterolæmic effect. A partial structural specificity seems required, even if it is not the particular structure of the essential acids, linoleic and arachidonic.

Though there was a variation in the response of the volunteers in each group to the various fat supplements, nevertheless 25 g. of cod-liver oil seemed to have a greater hypocholesterolæmic effect than an equal amount of corn oil. The greater number of double bonds or higher unsaturation of the fish oil may be responsible for this.

The iodine value of the cod-liver oil was 162 and the corn oil 115. 25 g. of each would therefore supply $162\times25/100=40$, and $115\times25/100=29$ units respectively per day. The ineffective daily dose of 10–15 g. of cod-liver oil would have supplied $162\times15/100=$ about 24 units per day, and the 10 g. of arachidonate $300\times10/100=30$ units per day.

These figures may indicate that the minimum effective daily dose of those polyunsaturated acids able to reduce plasma-cholesterol levels corresponds to about 30 iodine-value units per day, which was supplied in these experiments by two tablespoonfuls of cod-liver oil, marginally by an equal amount of corn oil, or by only 10 g. of ethyl arachidonate.

The hypocholesterolæmic effect of so small a quantity as 10 g. of ethyl arachidonate per day seems remarkable; for, when distributed over the body, only very low concentrations can have been present at the sites responsible for the cholesterol effects—even without allowing for the amount altered by in-vivo oxidation. Whether this indicates a particular avidity of the cholesterol molecule for arachidonic acid, and whether even smaller doses could be effective, is under investigation in this laboratory. The possibility, however, of a high avidity of cholesterol for arachidonic acid prevents a full discussion of the effects of the high-iodine-value fraction from cod-liver oil. This supplement followed that of ethyl arachidonate, and because there was insufficient material to repeat the experiment in the reverse order it is not known how much of the fall in cholesterol during the high iodine-value supplement resulted from the continued effect of the arachidonic acid. It seems, however, that this cod-liver oil fraction must have been actively reducing the plasma-cholesterol levels because they rose sharply as soon as it was discontinued.

Summary

In an investigation of the effect of certain fatty acids or oils on the plasma-cholesterol level, young healthy adults, aged 19–25, were given diets supplemented with: (*a*) ethyl arachidonate, (*b*) cod-liver oil, or (*c*) corn oil.

In one series of trials either ethyl arachidonate or a high-iodine-value fraction prepared from cod-liver oil were substituted for the same amount of animal fat in a controlled basic diet. Either supplement reduced the plasma-cholesterol by about 20–25% of the starting-height.

25–30 g. of cod-liver oil added to an uncontrolled diet produced a similar effect, but more slowly. The minimum effective dose seemed to be about 20 g. per day.

Corn oil, 25 g. per day, affected the level of the plasma-cholesterol less than the same amount of cod-liver oil.

These results suggest: (1) that the higher the iodine value of an oil or fat, the lower the effective minimum dose; and (2) that the action on the plasma-cholesterol depends upon the presence in the fatty acid of several unsaturated bonds which are neither *trans* nor conjugated.

We would like to acknowledge the cooperation of the many students without whom the work would have been impossible. We thank Roche Products Ltd., for their gift of synthetic ethyl arachidonate; British Cod Liver Oils (Hull and Grimsby) Ltd. for the specially refined cod-liver oil and the bulk preparation of the high iodine-value fraction as ' Ethive ', Pritchitt & Co. for freshly prepared powdered corn-oil/skimmed-milk emulsions; Cow & Gate Ltd. for the skimmed-milk powder; and the dieticians and staff of St. Mary's Hospital who arranged and provided the diets.

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" . . . The problem of human relations is still unsolved. Individuals quarrel; family groups and races quarrel; and nations growl at each other like dogs in the backyard. Why? Why is it we cannot get along with each other? Why must we always be suspicious of the other fellow? Why cannot we live in some kind of peace and harmony? This *can* be done, because we all know families where this is true. Why cannot we all do it? The answer is not far to seek. In spite of the thousands of years that man has existed in this minuscule corner of the universe, he still has no clear concept of what or who he is, what he is here for, or what, in a major sense, is not only the meaning of existence for himself, but, the meaning of the universe."—Emeritus Prof. H. S. BURR, PH.D., *The Neural Basis of Human Behavior*; p. 3. Springfield, Ill., and Oxford, 1960.

DIRECT ANTI-GLOBULIN-CONSUMPTION TEST FOR DETECTION OF IMMUNE ANTIBODIES

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THE indirect Coombs consumption test has been suggested as a means of investigating anti-thrombocyte antibodies and anti-leucocyte antibodies in serum (Steffen and Shindler 1955, van Loghem et al. 1958); but this and other methods, when applied in different laboratories, have given inconsistent results (Stefanini and Mele 1957).

In the search for antibodies adsorbed on the cells, several workers have obtained positive results with a direct anti-globulin test with thrombocytes (Dausset and Malinvaud 1954, Flückiger et al. 1953, Nelken and Gurevitch 1956). Technical difficulties, such as obtaining a homogeneous suspension of the thrice-washed thrombocytes restricted the usefulness of this method.

To prove the coating of thrombocytes and leucocytes with antibodies by another method the direct anti-globulin consumption test (D.A.C.T.) has been developed in this laboratory. The patients' cells, after repeated washings, are added to an antihuman-globulin serum with a known titre. If the cells have been sensitised in vivo, a significant drop in the anti-globulin serum titre takes place, whereas normal cells do not cause any such reduction.

Materials and Methods

Preparation of Anti-human-globulin Serum

Rabbits were immunised three times a week. The first injection was given in divided doses intravenously, intracutaneously, subcutaneously, and intramuscularly. In the following nine injections, the intravenous route was omitted. 5 ml. of human serum, diluted with an equal amount of physiological saline was injected at each immunisation. 3 days after the last immunisation the rabbits were bled, and the serum was diluted 10 times with physiological saline and heated to 65°C for 60 minutes to destroy the naturally occurring hæmagglutinins for human red blood-cells. The serum was then titrated against artificially sensitised red blood-cells, and absorbed with normal thrice-washed platelets. The serum was stored in small aliquots at −20°C. For use it was thawed and diluted in order to get an anti-globulin titre of 1/128–1/512. The diluted serum was kept in the refrigerator and could be used for up to 2 months.

Coating of Erythrocytes

4 ml. of a 3% suspension of thrice-washed erythrocytes, group O Rh+, in saline, was added to 1 ml. of anti-D serum with incomplete antibodies, having a titre of 1/32–1/64. The mixture was incubated for 30 minutes in a 37°C waterbath, and was centrifuged, and the coated cells were washed three times.

Anticoagulant

A solution of 1% 'Na$_2$-Sequestrene' (disodium-ethylene-diamine-tetra-acetic acid) and 1% 'Triton' W.R. 1339 (oxy-ethylated *tert*octyl phenol-formaldehyde polymer) was prepared in 0·7% sodium-chloride solution and used as the anticoagulant.

Washing Fluid

The standard anticoagulant solution diluted 1/10 with physiological saline (unbuffered, pH 6–7) was used as washing fluid for the platelets and leucocytes. All washings were carried out in the cold at a temperature of 4–6°C.

Preparation of Cells for D.A.C.T.

All glassware was coated with silicone. Blood was withdrawn into a syringe containing the anticoagulant in a proportion of 1/10.

Usually 9 ml. of blood was withdrawn. If the thrombocyte-count was less than 100,000 or the leucocyte-count less than 4000, 18 ml. of blood was withdrawn. The blood was put in siliconed 50 ml. tubes with a round bottom, and immediately fractionated.

Separation of platelets.—The platelets were separated by first centrifuging the blood in an 'International' refrigerated centrifuge (model PR 2) at 800 r.p.m. (150*g*) for 7 minutes, and then recentrifuging the platelet-rich plasma at 2000 r.p.m. (1800*g*), again for 7 minutes. The supernatant plasma was completely drained off by inverting the tube and was added to the erythrocytes. A few drops of the washing fluid were then added to the platelet sediment, mixed well, and gently shaken by hand until a homogeneous suspension was obtained. 15 ml. of washing fluid was then added to the platelet suspension and the tube recentrifuged at 2000 r.p.m. for 7 minutes. This was repeated three times. The platelets obtained after the third washing were used in the consumption test.

Separation of red blood-cells.—0·5 ml. of the platelet-free blood was centrifuged and the red blood-cell sediment was washed three times in 15 ml. of physiological saline. Erythrocytes from the sediment after the third washing were used in the consumption test.

Separation of white blood-cells.—To the remainder of the thrombocyte-free blood 1/4 volume of a 6% dextran solution (intrinsic viscosity 0·40 at 20°C) in physiological saline previously warmed to 37°C was added. The mixture was transferred to another siliconed tube and left at room temperature (20–25°C) for 30 minutes to allow for the sedimentation of the erythrocytes. The supernatant plasma containing the leucocytes, many erythrocytes, and some thrombocytes was then transferred to another siliconed tube and centrifuged at 800 r.p.m. for 7 minutes. To the sediment thus obtained 6 ml. of distilled water was added and the tube was shaken for exactly 20 seconds to hæmolyse the remaining erythrocytes. 2 ml. of a 3·4% sodium chloride solution was then added to restore isotonic concentration, and the tube centrifuged for a further 7 minutes at 800 r.p.m. The hæmolytic supernatant was removed, and the sediment containing the white blood-cells was washed three times in 15 ml. of the washing fluid. Cells from the final sediment were used for the D.A.C.T.

The D.A.C.T.

To 1 of 3 tubes, each containing 0·5 ml. of the anti-human-globulin serum, 0·1 ml. of the thrombocytes, to the 2nd 0·05 ml. of erythrocytes, and to the 3rd 0·05 ml. of leucocytes were added, and the cells were resuspended in the serum by gentle shaking. The blood-cell concentrations of the 3 samples in the antiglobulin serum were as follows: thrombocytes 50,000–100,000 per c.mm., erythrocytes 500,000 per c.mm., and leucocytes 20,000 per c.mm. The tubes were kept at room temperature (20–25°C) for 30 minutes. They were then centrifuged for 10 minutes at 3000 r.p.m., and the supernatants were titrated against the artificially sensitised cells. The titre was expressed in terms of the last tube showing macroscopic agglutination.

0·5 ml. samples of anti-human-globulin serum absorbed with thrice-washed thrombocytes, erythrocytes, and leucocytes from healthy donors served as controls.

Elution Experiments

Eluates were prepared from thrice-washed thrombocytes, erythrocytes, and leucocytes obtained from the patients and from healthy controls. Immediately after the separation of the cells, 0·1 ml. of cells was shaken with 0·5 ml. of physiological saline in a 56°C waterbath for 7 minutes. The eluates were separated from the cells by centrifuging in cups jacketed with water at 56°C, and then stored at −20°C until used. The

* Prof. Gurevitch died on Oct. 20, 1960.

TABLE I—RESULTS OF D.A.C.T. IN A PATIENT WITH PANCYTOPENIA

Serum	Titre							
	1/1	1/2	1/4	1/8	1/16	1/32	1/64	1/128
Unabsorbed anti-human-globulin serum	+++	+++	+++	+++	++	++	+	±
Serum absorbed with:								
Thrombocytes	++	+	±	−	−	−	−	−
Erythrocytes	+++	++	+	±	−	−	−	−
Leucocytes	+++	++	±	−	−	−	−	−

eluates were examined by the neutralisation test and the complement-fixation test. To determine their neutralisation capacity, 0·2 ml. of the eluate was added to 0·2 ml. of anti-human-globulin serum, and the mixture was incubated for 30 minutes after which it was titrated against artificially sensitised erythrocytes.

In the complement-fixation experiments, 0·1 ml. of eluate was used as antigen, while 0·1 ml. of a 1/500 dilution of the anti-human-globulin serum served as antibody. In all experiments, 2 full units of complement was used. Complement, amboceptor, and a 2 % sheep-erythrocyte suspension, were also added in 0·1 ml. quantities.

TABLE II— RESULTS OF THE D.A.C.T. IN A PATIENT WITH MILD I.T.P.

Serum	Titre							
	1/1	1/2	1/4	1/8	1/16	1/32	1/64	1/128
Unabsorbed anti-human-globulin serum	+++	+++	+++	+++	++	++	+	±
Serum absorbed with:								
Thrombocytes	+++	++	+	+	±	−	−	−
Erythrocytes	+++	+++	+++	+++	++	++	+	±
Leucocytes	+++	+++	+++	+++	++	++	+	±

Results

D.A.C.T.s were carried out with thrombocytes, erythrocytes, and leucocytes obtained from 80 patients with various diseases. Thrombocytes, erythrocytes, and leucocytes from 20 healthy persons served as controls.

Table I shows the results in a case of pancytopenia. A significant drop in the titre from 1/128 to 1/4 or 1/8 was obtained with all three cell suspensions.

Table II shows results of the D.A.C.T. in a mild case of idiopathic thrombocytopenic purpura (I.T.P.) Repeated examinations of the patient's serum for thrombo-agglutinins were negative.

Titre of anti-globulin serum was reduced from 1/128 to 1/16 with the thrombocytes. No consumption of anti-globulin was obtained with erythrocytes and leucocytes of this patient.

Table III shows the results in a patient with severe thrombocytopenic purpura, with strongly positive thromboagglutinins present in the serum.

Complete consumption of anti-globulin serum by thrombocytes took place in this instance, but the titre remained unchanged after treatment with erythrocytes and leucocytes.

Eluates prepared from cells of patients showing a positive D.A.C.T. were active in neutralising anti-human-globulin serum. Table IV compares typical results of such neutralisation experiments with those obtained in controls.

TABLE III—RESULTS OF D.A.C.T. IN A PATIENT WITH SEVERE I.T.P.

Serum	Titre							
	1/1	1/2	1/4	1/8	1/16	1/32	1/64	1/128
Unabsorbed anti-human-globulin serum	+++	+++	+++	+++	++	++	+	±
Serum absorbed with:								
Thrombocytes	±	−	−	−	−	−	−	−
Erythrocytes	+++	+++	+++	+++	++	++	+	±
Leucocytes	+++	+++	+++	+++	++	++	+	±

Eluates prepared from thrombocytes of patients with I.T.P. neutralised anti-human-globulin serum while eluates prepared from normal thrombocytes did not. Similar results were obtained with eluates from white blood-cells.

TABLE IV—NEUTRALISATION EXPERIMENTS WITH ELUATES FROM NORMAL AND FROM PATIENTS' THROMBOCYTES AND LEUCOCYTES

—	Titre							
	1/1	1/2	1/4	1/8	1/16	1/32	1/64	1/128
Anti-human-globulin serum with eluate from normal thrombocytes	+++	+++	+++	++	++	+	±	−
Anti-human-globulin serum with eluate from thrombocytes of patient with I.T.P.	±	−	−	−	−	−	−	−
Anti-human-globulin serum with eluate from normal leucocytes	+++	+++	+++	++	++	+	±	−
Anti-human-globulin serum with eluate from leucocytes of a patient with lymphatic leukæmia ..	++	+	±	−	−	−	−	−

Eluates from either thrombocytes or leucocytes that gave a positive D.A.C.T. were positive in the complement-fixation tests. Eluates prepared from thrombocytes and leucocytes of healthy persons, giving a negative D.A.C.T., served as controls. Results of these experiments showed that eluates prepared from normal cells could not fix complement in the presence of anti-human-globulin

TABLE V—RESULTS OF THE D.A.C.T. IN 80 PATIENTS WITH VARIOUS BLOOD DISORDERS

Diagnosis	No. of patients	Positive D.A.C.T. with thrombocytes	Positive D.A.C.T. with leucocytes	Positive D.A.C.T. with thrombocytes and leucocytes	Positive D.A.C.T. with erythrocytes	Negative D.A.C.T.	Thrombocyte-count over 150,000 per c.mm.	Thrombocyte-count less than 150,000 per c.mm.	Leucocyte-count over 4000 per c.mm.	Leucocyte-count less than 4000 per c.mm.
I.T.P. (acute)	4	2	0	1	0	1	0	4	4	0
I.T.P. (chronic)	8	6	0	2	0	0	1	7	7	1
Thrombotic thrombocytopenic purpura	3	1	0	2	0	0	1	2	3	0
Non-thrombocytopenic purpura	7	0	0	0	0	7	7	0	7	0
Acute thrombocytopenia due to drugs	2	0	0	0	0	2	0	2	2	0
Pancytopenia	5	2	0	3	1	0	1	4	1	4
Systemic lupus erythematosus..	2	1	1	0	0	0	1	1	2	0
Myeloid leukæmia (chronic) ..	4	1	0	2	0	1	3	1	..	0
Lumphatic leukæmia (chronic)..	15	4	1	10	0	0	8	7	11	4
Carcinomatosis, generalised with metastasis	30	4	5	20	3	1	16	14	25	5

serum, whereas the eluates of the patients' cells fixed complement up to a dilution of 1/6.

The results of the D.A.C.T. carried out with the thrombocytes, leucocytes, and erythrocytes of 80 patients are summarised in table V. 35 of these patients were examined two to five times. Only a clear-cut reduction of the anti-globulin serum by 2 tubes at least was taken as a positive result. Considerable differences in the intensity of agglutination were noted, but this was not taken into consideration when reading results.

Discussion

Studies of the immunology of various blood disorders have led to the development of many important serological methods. Though these methods gave fairly reliable results in cases of anæmia, they were unsatisfactory in leucopenia and thrombocytopenia, where an antigen/antibody reaction might be considered as the underlying cause.

Only a few attempts have been made to elucidate the immunological process in hæmatological disorders by studying the state of sensitisation of the blood-cells instead of examining the patient's serum. Several workers using a direct Coombs test have obtained positive results with platelets in a few cases, but a similar application to leucocytes has not been reported to our knowledge.

The D.A.C.T. is relatively simple to perform and gives easily reproducible results.

The application of the D.A.C.T. to a group of patients with different hæmatological disorders and neoplastic diseases showed that the most satisfactory results were obtained in both acute and chronic idiopathic thrombocytopenic purpura (I.T.P.).

Of 12 patients examined, 11 gave a positive test—8 with thrombocytes, and 3 with both thrombocytes and leucocytes. Only 1 case of acute I.T.P. was negative. Of 3 cases of thrombotic thrombocytopenic purpura, 1 gave a positive result with thrombocytes, and 2 with both thrombocytes and leucocytes. On the other hand, 7 cases of non-thrombocytopenic purpura (Henoch-Schönlein and thrombopathia) and 2 cases of acute thrombocytopenia due to drugs gave negative results with all three cells systems.

5 cases of pancytopenia were examined by the D.A.C.T. and, of these, 2 gave positive results with thrombocytes only, and 3 with both leucocytes and thrombocytes. 1 of these also gave a positive result with red blood-cells. The direct Coombs test with erythrocytes was positive in this case.

Of 2 cases of systemic lupus erythematosus, 1 was positive with thrombocytes, and the other with leucocytes.

The results of the D.A.C.T. were specially interesting in leukæmia and generalised carcinomatosis. 4 cases of chronic myeloid leukæmia and 15 cases of chronic lymphatic leukæmia were examined. Only 1 case of myeloid leukæmia was negative. The other 18 cases all gave positive results—5 with thrombocytes, 1 with leucocytes, and 12 with both thrombocytes and leucocytes.

The results in 30 cases of generalised carcinomatosis with metastases deserve mention. All but 1 of them were positive by the D.A.C.T.—4 with thrombocytes only, 5 with leucocytes only, and 20 with both thrombocytes and leucocytes. 3 cases were also positive with erythrocytes. Some of these patients were examined repeatedly at weekly or fortnightly intervals, always with similar results. Hæmatological examinations showed that 14 out of the 30 patients of this group had thrombocytopenia. Other investigators have been able to demonstrate thromboagglutinins in some of the sera of patients with neoplastic diseases (Harrington et al. 1956, Stefanini et al. 1956, Zucker et al. 1959). The lifespan of thrombocytes is considerably reduced in patients with malignant tumours (Alfos et al. 1959).

The interpretation of the D.A.C.T. remains to be investigated further, because nothing definite can yet be said about the nature of the coating globulin, which may or may not be a true antibody. Dausset (1959a and b), whose experience is similar to ours, though he uses a somewhat different technique, has also not been able to arrive at a final conclusion about the nature of the coating globulin. It is of interest that the coating globulin is very firmly attached to the cells. In our experiments, even ten washings with 15 ml. of saline did not change the result of the test. Cells giving a positive or a negative D.A.C.T. after 3 washings gave the same result after ten.

Cells which were artificially disintegrated by repeated freezing and thawing gave a slightly positive D.A.C.T.

The separation of the cells for the D.A.C.T. must be carried out immediately the blood has been withdrawn. Leaving the blood to stand at room temperature for as short a period as 1 hour, or at 6°C for 3–4 hours, may give false positive results with thrombocytes. After a longer interval (5–6 hours) false positive results may also be obtained with the leucocytes.

Different anti-human-globulin sera have been used in the D.A.C.T. Some commercial Coombs sera were found to be unsuitable for these experiments as their anti-globulin titre was already reduced after one absorption with normal thrice-washed thrombocytes or leucocytes. Either 'Merthiolate' or sodium azide, which are sometimes found in commercial preparations, might also interfere with the test.

Summary

A new direct anti-globulin consumption test has been developed for the detection of immune antibodies. This test is relatively simple and gives easily reproducible results.

Pure suspensions of erythrocytes, leucocytes, and thrombocytes from the blood to be examined are added to an anti-globulin serum of known titre and are left at room temperature for 30 minutes. The supernatant fluid is then tested for its anti-globulin titre against red blood-cells coated with incomplete anti-D serum. The difference in the titre of the anti-globulin serum before and after the addition of the examined cells is taken as a measure of their sensitisation. If the cells are heavily coated, complete consumption of the anti-globulin takes place.

This test proved most satisfactory in cases both of acute and of chronic idiopathic thrombocytopenic purpura. The test was also satisfactory in cases of thrombotic thrombocytopenic purpura, pancytopenia, and systemic lupus erythematosus. Positive results were obtained in cases of leukæmia and of generalised carcinomatosis.

The nature of the coating globulin is not yet known, and it cannot be said with certainty that it is a true antibody.

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THE TIGHT BRAIN

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DURING the past few years various techniques designed to reduce brain bulk and tension have been introduced into neurosurgical practice. The efficacy of these techniques varies greatly in different circumstances. In this paper I discuss the underlying physiological mechanisms and then suggest the limitations and advantages of induced hypotension, induced hypothermia, overventilation, and the infusion of hypertonic solutions.

The cerebrospinal-fluid pressure and the intracranial venous pressure can be reduced to atmospheric, or even subatmospheric, by putting the patient in a head-up position and by ensuring quiet unobstructed respiration. With the newer techniques, however, it is possible to reduce the bulk of the brain and to soften its consistence.

The bulk and consistence of the brain depend upon: (1) the mass of cellular elements present, which cannot readily be altered; and (2) the amount of tissue fluid present. The latter is partly under our control.

Formation of Tissue Fluid

Tissue fluid is normally formed as a transudate from the arteriolar end of the capillaries and most of it is reabsorbed at the venous end. Its formation is a simple function of the differences in hydrostatic and osmotic pressures on each side of the capillary wall.

For example, if the hydrostatic pressure of the blood in the arteriolar end of the capillary is 32 mm. Hg and the osmotic pressure of the non-diffusible plasma-proteins is 25 mm. Hg, there is a resultant filtration pressure of $32-25=7$ mm. Hg tending to push fluid out through the capillary wall. At the venous end of the capillary, the hydrostatic pressure of the blood is, say, 12 mm. Hg, the osmotic pressure of the plasma-proteins—slightly higher than at the arteriolar end because of loss of the water that has diffused out—is, say, 27 mm. Hg. There will, therefore, be a negative pressure here of $27-12=15$ mm. Hg tending to withdraw water from the tissue spaces into the capillary.

Obviously, increased hydrostatic pressure within the capillary will increase tissue-fluid formation and hinder its reabsorption; and increases in the osmotic pressure of the blood will hinder its formation and encourage its reabsorption. If the hydrostatic pressure along the whole length of the capillary is greater than the osmotic pressure of the plasma-proteins, fluid will be lost from the whole length of the capillary and none will be reabsorbed.

Normally the osmotic pressure of the non-diffusible tissue constituents is so small compared with that of the plasma-proteins that it can be ignored. If, however, as a result of injury, cell contents leak into the tissue fluid, and if, as further response to injury, the capillaries become more permeable and allow plasma-proteins to leak out, the resulting tissue fluid will have a high protein content. This protein will, by its osmotic effect, encourage the diffusion of water out through the capillary wall and greatly impede its return. This is the process by which inflammatory œdema is formed.

Factors Influencing Capillary Hydrostatic Pressure

The capillaries are protected from the full force of the arterial blood-pressure by the narrow bore of the muscular arterioles. After overcoming the arteriolar resistance, the hydrostatic pressure of the blood in the arteriolar end of the capillary is about 30 mm. Hg (Landis 1930). If the arteriole were to relax, however, the capillary would be subjected to a much greater pressure. By the time the blood has overcome the resistance of the capillary itself and reached the venous end its pressure has dropped to some 12 mm. Hg. This residual pressure is the "vis a tergo" that impels the blood into the veins. Even though the pressure in the large veins is subatmospheric, the pressure in the venous end of the capillary is still about 12 mm. Hg. Basically, therefore, the blood-pressure in the capillary is controlled by the systemic arterial blood-pressure and the arteriolar resistance or tone. If the pressure in the veins is raised, the pressure at the venous end of the capillary will rise until it is still some 12 mm. Hg higher than that in the veins. If the veins are completely obstructed, the venous capillary pressure will rise until it equals that at the arteriolar end when blood flow will cease (though fluid is still diffusing out of the capillary).

Effect of Hypotension

The capillary blood-pressure (and, therefore, the filtration pressure) is dependent ultimately upon the systemic blood-pressure. Increase in the systemic blood-pressure will tend to increase tissue-fluid formation and therefore to increase brain bulk and tenseness. Lowering the blood-pressure will shrink and soften the brain.

Effects of Overventilation

High arteriolar resistance reduces the filtration pressure in the capillary. The argument here is the same as that followed by Wood (1954) in discussing the protective effect of a high pulmonary vascular resistance in preventing the formation of pulmonary œdema in patients with mitral stenosis. Now, the tone of the cerebral arterioles is largely controlled by the pH and the CO_2 and O_2 concentrations in the blood and tissue fluid perfusing them. If the pH and the O_2 concentration are raised and the CO_2 tension lowered there will be an increase in arteriolar tone and resistance. This will reduce the hydrostatic and filtration pressure in the capillary. This, in turn, results in a reduction in tissue-fluid formation, and a reduction in brain bulk and tenseness follows. Thus overventilation shrinks and softens the brain.

Conversely, asphyxia, by causing a relaxation of the arterioles, produces cerebral swelling and œdema.

If the patient is in a head-up position and the larger veins near the superior sagittal sinus are exposed, they can be seen to empty and fill with each respiratory cycle. If the patient is being ventilated with a pump, they will fill during the positive-pressure phase of inflation and empty during the negative or low-positive phase of expiration. But they can also be seen to empty (i.e., collapse completely) even though a positive pressure of 5–10 cm. H_2O is maintained during expiration. I suspect, therefore, that the hydrostatic pressure in an intracranial sinus will remain atmospheric or subatmospheric until the pressure in the chest, measured in centimetres of water, equals the height in centimetres of the sinus above the heart.

The better conditions obtained by the use of pumps that produce a negative pressure during expiration are, in my opinion, due to: (1) the greater tidal volume and more efficient overventilation achieved with a negative-pressure phase; and (2) the reduction in venous-pressure which can sometimes, but only sometimes, be brought about by a negative phase, when positioning the patient is ineffective.

Effects of Hypertonic Infusions

If the osmotic pressure of the plasma is increased, water will tend to pass from the extravascular into the vascular compartment. This redistribution will increase the blood-volume and raise the blood-pressure; it will also reduce the osmolarity of the plasma. At the same time the osmolarity of the tissue fluid will rise slightly and this process will continue until a new equilibrium is reached. In reaching this new equilibrium the increasing blood-pressure, caused by an increasing blood-volume, will be partly counteracting the effect of the increased plasma osmolarity.

For example, a 500 ml. infusion of triple-strength plasma will withdraw from the extracellar compartment some 1000 ml. of water, thus becoming equivalent to an infusion of 1500 ml. Assuming a blood-volume of 6 litres, this will represent an increase in the blood-volume of 25%

In intracranial surgery, this increase in blood-volume and blood-pressure sometimes offsets the advantages gained by hypertonic infusions.

The brain receives about $^1/_7$ of the cardiac output (Kety and Schmidt 1945). Assuming a brain weight of 1500 g. in a patient weighing 75 kg., this means that $^1/_{50}$ of the body is receiving $^1/_7$ of the circulating blood. If the blood is made temporarily hypertonic we would therefore expect it to withdraw proportionately more fluid from the brain than from parts less liberally supplied. This is sufficient to explain the apparently selective action of hypertonic infusions in relieving cerebral œdema and raised intracranial pressure without having to postulate peculiarities of the blood-brain barrier.

Hypothermia

Cooling patients to 30°–32° C does not seem as effective in reducing brain bulk as overventilation or hypertonic infusions—its main usefulness lies in protecting cells from the effects of an inadequate blood-supply. Cooling will, however, by reducing metabolism reduce the formation of CO_2 and of acid metabolites and will, therefore, have an effect resembling that of overventilation.

Applications and Limitations of These Techniques

All methods of reducing brain bulk depend eventually upon their action on the exchange of fluid across the cerebral capillary wall. They must, therefore, be inter-dependent. Thus, for hypertonic infusions to produce their best effect, ventilation must be adequate, and the blood-pressure and temperature must be normal. But each technique has concomitants which tend to nullify the effects desired—for example:

1. Active cooling of a patient often raises the blood-pressure, and at lowered body temperatures breathing may be inadequate.
2. Hypertonic infusions raise the blood-pressure.
3. Over ventilation can sometimes require so high an inflation pressure that the venous pressure is unduly raised.
4. Hypotension may cause serious tissue anoxia.

Factors Governing Choice of Technique

Overventilation

In the operating-theatre, I think, overventilation provides the surest and safest method of producing a small soft brain. But, as already suggested, there are difficulties with this technique and it is not always successful. Let us consider two types of case.

Firstly, there is the middle-aged man with chronic bronchitis and emphysema. Because of his fixed chest and poor lung compliance, this type of patient may prove difficult to ventilate at all and overventilation may be possible only with a very high inflation pressure and a long inflation time. This high inflation pressure and inflation time may raise the central venous pressure sufficiently to cause engorgement of the intracranial veins and sinuses. Thus, attempts at overventilation may make conditions worse rather than better.

There is another possible explanation for bad results with overventilation in this type of patient. In them, spontaneous breathing is often inadequate and they become acclimatised to a lowered oxygen tension and a raised CO_2 tension. Though I have no definite proof, it is possible that the intracranial vessels become insensitive as a result of these abnormal tensions and no longer respond normally to changes in tension.

Secondly, there are those patients with large tumours and very high intracranial pressures. The most vigorous overventilation may produce little or no effect. I can think of two possible explanations for this though, again, I have no direct evidence to support them:

1. A cerebrospinal fluid pressure of 240 mm. H_2O is equivalent to nearly 18 mm. Hg; this is considerably higher than the pressure normally found in the venous end of the capillary and much higher than that found in the intracranial sinuses in a head-up position. As the intracranial pressure rises, the circulation is impeded. The tissues become anoxic and CO_2 accumulates. The arterioles dilate in response to these changes and so raise the capillary pressure, but the circulation remains borderline, being only maintained by high CO_2 tension and low O_2 tension. The vessels may then no longer respond normally to changes in these tensions.
2. Large or active tumours are associated with new malformed blood-vessels, and these also may be unresponsive to changes in gas-tensions and pH.

Hypertonic Infusions

Hypertonic infusions have long been part of the standard treatment of patients with cerebral œdema or raised intracranial pressure, for which they are very effective. They are also effective when overventilation has failed, and (if my previous suppositions are right) they succeed because they do not depend for their effect upon alterations in vascular tone but solely upon alterations in osmolarity of the circulating blood. For reducing brain bulk it matters little what substances are used in the hypertonic solution. The effect will be related to the tonicity and quantity of the solutions given rather than its constituents. But different solutions have different side-effects, and it is a consideration of these that should decide the choice of solution. For example, in a " shocked " patient with a head injury, hypertonic plasma or dextran, which will expand the blood-volume for several hours, would be better than urea. In a patient with a normal blood-volume, or one in whom a diuresis is desired, urea would be better. In those with signs of cerebral irritation, as in hypertensive encephalopathy or eclampsia, a solution that has a sedative action, such as magnesium sulphate, would be the natural choice.

Hypotension

Induced hypotension to levels below 90–100 mm. Hg is now considered to be too dangerous to have many justifiable uses (Davison 1953). But to lower the blood-pressure intentionally to 100–120 mm. Hg is not only useful but often necessary if good results are to be obtained. This applies whether using overventilation, hypothermia, or hypertonic infusions, and is another example of the interdependence of all these mechanisms.

Hypothermia

The effect of hypothermia on brain bulk is definite but small when compared with the effects of overventila-

tion or hypertonic infusions. Its use, therefore, is confined mainly to two types of case. First, those in which the blood-supply to the brain may be temporarily inadequate; and secondly, those in which such great difficulty is expected that every possible aid must be used.

Conclusions

By a mixture of observation and speculation, I have attempted to coordinate and rationalise our use of new techniques to reduce brain bulk and tension. If my arguments are correct, we should be able to predict more often which cases will benefit from emphasis upon a particular technique and which will not. But most important of all is the realisation that only by a combination of techniques can the best results be obtained. To alter only one or two factors out of four will often result in disappointment.

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A NEW TECHNIQUE IN THE SURGERY OF MASSIVE GASTRODUODENAL BLEEDING

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THROUGHOUT the long history of the surgery of massive gastroduodenal hæmorrhage, it has been known that sometimes at operation the lesion cannot be found in spite of careful examination of the outer surface of the stomach or duodenum.

For many years, the teaching was that in these circumstances the surgeon should perform a standard 70% gastric resection. By so doing it was hoped that the lesion would be excised with the stomach. In more recent times such " blind gastrectomy " has not been favoured, for the ulcer may be retained within the patient, in either the stomach or the duodenum, and may continue to bleed.

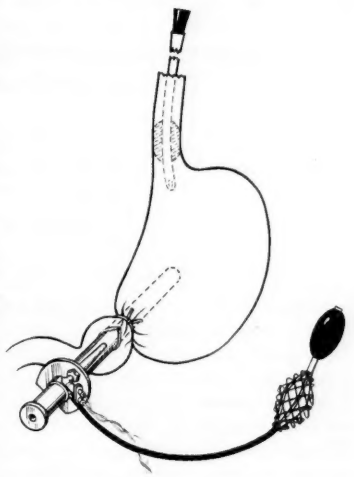
During the past few years it has been customary to open the stomach by a gastrotomy, and to inspect and palpate the mucosal surface of the stomach and of the duodenum. Bohn (1949) pointed out that the thrombosed arterial bleeding point could sometimes be palpated as a small seedling within the stomach. But to palpate, or to see clearly, the whole extent of the gastric mucosa is not easy unless an enormous gastrotomy incision is made. The mucosa lies in folds and a small ulcer is easily hidden. Also the duodenum cannot be properly inspected without a fairly extensive incision into it. In fact, while sometimes the mucous membrane of the stomach and that of the duodenum must be inspected thoroughly, gastrotomy is a most unsatisfactory means of doing it.

I wish to record a technique which I have used and which I believe to be of great value in this type of case. Perhaps it is best described by reporting the management of a case.

Case-report

The patient was a man aged 47, who gave a fifteen-year history of dyspepsia. He was admitted to hospital with severe hæmatemesis, and gave a recent history of pain one hour after food. He was treated initially on a medical regimen; but bleeding continued, and after transfusion of six pints of blood the abdomen was opened by an oblique incision across the epigastrium. Stomach and duodenum appeared normal. The stomach in the region of the lesser curve was rubbed with a gauze swab, as was the anterior surface of the duodenum. This procedure is sometimes helpful, for it can often bring up a whole mass of small petechial hæmorrhages over an ulcer which can neither be seen nor felt. In this patient such hæmorrhages did appear in the region of the mid-lesser curve, and their occurrence suggested that there was an impalpable ulcer at this level. No such response was obtained from the duodenum. If gastrectomy was to be performed, it was necessary to see the lesion, so that the gastrectomy would include the ulcer in the excised part of the stomach.

A cuffed œsophageal tube was inflated in the lower œsophagus to occlude the lumen. An incision 1 in. long was made in the anterior surface of the stomach near to the pylorus. All gastric contents were carefully removed by suction. A sterilised standard Yeoman's sigmoidoscope, with magnifying eyepiece, was inserted through the small gastrotomy wound, and this site was made airtight by a thin rubber tube placed around the stomach (see figure). The stomach was then inflated by bellows until it was considerably distended, and gastroscopy was carried out through the sigmoidoscope. The view through the wide Yeoman's instrument was excellent, and it was enhanced by the use of the magnifying eyepiece.



Sigmoidoscope inserted through gastrotomy wound.

A shallow ulcer was seen in the region of the lesser curve, and the thrombosed end of the bleeding artery in the centre of the ulcer was seen as a small dark spot. A Billroth I gastrectomy was performed to excise the ulcer, and from this operation the patient made an uninterrupted recovery.

Comment

During this " operative gastroscopy " a wonderful view was obtained of the gastric cardia, and the typical rosette appearance of its mucosal folds was evident. It was interesting to see the cardia open and shut in response to changes in the intragastric pressure.

A sigmoidoscope gives an excellent view of the upper reaches of the stomach, and any lesion near the cardia cannot fail to be seen.

Cystoscopy is an excellent examination because the bladder is fully distended. Full distension must be the key to a satisfactory gastroscopy, and this is obtained in the examination described here. Some surgeons have used operative gastroscopy to locate a bleeding lesion, but the stomach must be completely emptied of fluid, and sometimes of clot; and gastroscopy is a safe technique only in the hands of the most experienced physicians and surgeons.

Summary

Gastric ulcers may not be palpable, and the position of the lesion must be known accurately before gastrectomy is carried out.

Gastroscopy during the operation is usually difficult, and is a technique for only the most experienced.

Full distension of the stomach seems the key to a successful gastroscopy. The use of a sigmoidoscope, introduced through a small gastrotomy wound, is advo-

cated. The stomach, after occlusion of the lower part of the œsophagus by a cuffed tube, can be fully distended with air. An excellent view may then be obtained of the whole of the gastric mucosa.

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DEATH FROM HYPOTHERMIA IN STEATORRHŒA

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STEATORRHŒA is becoming well known for its protean manifestations. Apart from the gross nutritional disorder so clearly the result of starvation from malabsorption of food, more subtle deficiencies are known to occur, sometimes as isolated presenting phenomena. Among these are deficiencies of iron, folic acid, or vitamin B_{12}; deficiencies of the commoner electrolytes such as sodium, potassium, and calcium; and deficiencies of both water-soluble and fat-soluble vitamins.

Although many patients tolerate their steatorrhœa well over very many years, the prognosis is on the whole poor. Cooke et al. (1953) found that in 100 well-established cases, 14 patients died during the period of study, which averaged five years. The immediate cause of death is often obscure and much more needs to be learnt about this. For instance, magnesium deficiency has only recently been added to the known complications (Hanna et al. 1960).

In this paper we record that 2 patients under our care died unexpectedly from hypothermia. This is a possibility that has to be borne in mind. Moreover, as Sheehan and Summers (1952) pointed out, it is only too easy for the nurses, using ordinary clinical thermometers, to record normal body temperatures though there is gross hypothermia. Indeed, we made this mistake for a short time with our first patient.

Case-reports

Case 1.—A woman, aged 61, was admitted on July 8, 1957, because of heart-failure precipitated by paroxysmal supraventricular tachycardia. Extensive eczema, from which she had suffered for a decade, was present on the back, thighs, and face. A few weeks later, when she began to get out of bed, her short stature was noted. Height 53·5 in. (crown to pubis 26·5 in.), span 58 in. Serum-calcium 6·3 mg. per 100 ml., plasma-phosphorus 3·0 mg. per 100 ml., and plasma-alkaline-phosphatase 15 King-Armstrong (K.A.) units indicated osteomalacia. Urinary calcium excretion was low at 12 mg. and 35 mg. per 24 hours (normal 120–220 mg.). Skeletal X-rays showed the changes of a very mild chronic osteomalacia. She said that her bowels had opened three times daily for as long as she could remember and that her motions were never well formed. Though no records could be found, she said she had been a patient at the Hospital for Sick Children, Great Ormond Street, where "rickets" was found. A 5-day fat balance showed the presence of steatorrhœa with 84·9% absorption.

There was a slight iron-deficiency anæmia and a flat glucose-tolerance curve (rising to a maximum of 115 mg. from 95 mg. after 50 g. glucose). Serum-albumin 2·6 g. per 100 ml. Her steatorrhœa was thought to be the result of mild cœliac disease persisting into adult life. Because her symptoms were slight she was not given a gluten-free diet, but an attempt was made to correct her abnormal metabolism by giving dihydrotachysterol (D.H.T.) 1 mg. twice daily. After this her eczema improved. This aspect has been reported elsewhere (Dent and Garretts 1960).

In December, 1957, she had shingles and on March 2, 1958, post-herpetic pain led to her readmission. Her general condition was good, but her temperature averaged 96–97°F. She was allowed home for a few days over Easter early in April for domestic reasons. This was an unusually cold Easter and her home was poorly heated. On her return to hospital on April 8 she was cold, mentally dull, and complained of diarrhœa, hoarseness, and wheezing. Temperature 96·4°F, pulse-rate 56, blood-pressure 90/40 mm. Hg. Serum-calcium 7·5 mg. per 100 ml. Her dose of D.H.T. was raised to 5 mg. three times daily.

On April 9 she had spontaneous spasms of muscles and these failed to respond to 4·3 g. calcium gluconate intravenously. Her temperature remained low on the ordinary clinical thermometer, and a lower-reading rectal thermometer was used from that evening onwards. This showed temperatures between 85°F and 93·4°F (fig. 1). During the early hours of April 10, when

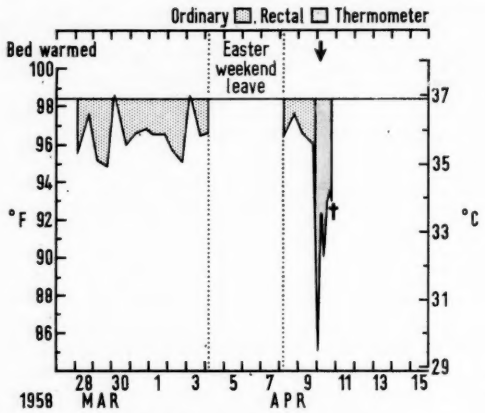

Fig. 1—Temperature chart in case 1.
Her true temperature during April 8 and 9 may well have been lower than that shown by the ordinary clinical thermometer.

her temperature was 85°F, her blood-pressure fell to 40/20 mm. Hg. There was no response to intravenous methedrine 30 mg., corticotrophin 25 units, hydrocortisone hemisuccinate 100 mg., or triiodothyronine 20 μg. Her bed was warmed with hot-water bottles but she became deeply comatose and died at midday on April 10.

At necropsy there were numerous superficial mucosal erosions of larynx, œsophagus, and stomach; these were considered to be terminal. The pituitary and parathyroid glands were normal. The thyroid gland was slightly smaller than normal and histological examination showed scanty colloid. The adrenal glands showed areas of hæmorrhagic necrosis. There were a few areas of fat necrosis in the pancreas. The small intestine was microscopically normal.

Case 2.—A general practitioner, aged 59, was admitted on June 13, 1959, complaining of worsening diarrhœa, weakness, emaciation, and œdema of his ankles. In childhood cœliac disease had been diagnosed by Prof. G. F. Still. He had had severe diarrhœa between 2 and 8 years of age. He improved when given a low-fat diet, and went to boarding-school. He ate normal food but noted that excess carbohydrate would cause diarrhœa and vomiting. He was then short and was intolerant of cold. Nevertheless he played games. After the age of 19, while at Oxford, he grew 5–6 in. in 18 months, with the development of pubertal changes. He remained well for some time, although he was always thin. At 51 he had miliary tuberculosis, treated successfully with streptomycin and *p*-aminosalicylic

acid. He began to have further attacks of diarrhœa with pale stools; and at 53 he was admitted to hospital with lassitude and œdema. Steatorrhœa with 25 g. of fat daily in his stools was then noted. When he was 57 he was treated with plasma infusions for hypoproteinæmia. A few months before admission the diarrhœa had worsened with exacerbation of all his previous symptoms. He had also had tetanic cramps and paræsthesiæ. He had, however, managed to continue with his practice till just before admission.

He was very thin (50·8 kg, 5 ft. $9^3/_8$ in. tall) and looked older than his years. There was some ankle œdema, and he had strongly positive Chvostek and Trousseau signs. His temperature averaged 96·5°F. He was having three typically steatorrhœic motions per day weighing 0·5–1·0 kg. Plasma showed calcium 5·3, phosphorus 2·2, magnesium 0·6, urea 30 mg. per 100 ml., sodium 136, potassium 3·2, chlorides 102, bicarbonate 24·6 mEq. per litre; albumin 2·2, globulin 2·5 g. per 100 ml.; alkaline phosphatase 9 K.A. units. He had a macrocytic normochromic anæmia; skeletal X-rays were normal; 24-hr. urinary calcium was 20 mg. Investigations fully confirmed the steatorrhœa: fat balance showed 52% absorption, he had a flat glucose-tolerance curve, and had abnormal absorption of ^{131}I-labelled fat. Pancreatic function was normal.

At first he refused to go on a gluten-free diet, having tried this previously without success. Treatment was therefore directed towards correcting his anæmia with intravenous iron, folic acid, and cyanocobalamin (vitamin B_{12}). His electrolyte abnormalities were treated with calciferol and extra magnesium. His plasma levels became normal, he lost his tetany and felt better, but he did not gain weight or lose his diarrhœa, as measured by the daily weight of his stools. Prednisolone was then given, also without success; and, finally, he was pressed into accepting a strict gluten-free diet. His weight, however, continued to fall slowly.

Throughout his stay his temperature, measured on a low-reading thermometer, was at low-normal levels (95–97°F); and, when a little lower than usual (as on August 31), was associated

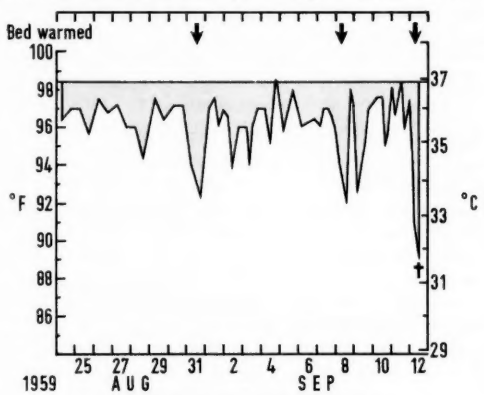

Fig. 2—Temperature chart in case 2.
A low-reading thermometer was used throughout.

with weakness and lethargy. In the early morning of September 8, it suddenly dropped to 92·F, and he became cyanosed and disorientated. His blood-pressure was 170/120, and plasma-sodium and plasma-potassium were normal. Hypoadrenalism was therefore discounted and he was treated by warming alone, with good recovery. On September 12 his temperature again fell, this time to 89°F, and he relapsed into coma and died despite warming and treatment with hydrocortisone (100 mg. intramuscularly and 100 mg. intravenously) and triiodothyromine (100 μg. intravenously). His temperature chart during his last few weeks of life is shown in fig. 2.

At postmortem examination the only clear macroscopic abnormalities were signs of old tuberculosis in the lungs and a hæmorrhage into the right adrenal gland; lipid was absent from both adrenals. Other endocrine glands appeared normal. Microscopic examination of specimens taken gave no further information.

Discussion

The temperature charts of these two patients leave no doubt that they suffered from a terminal hypothermia; and in the absence of any other evident cause, it seems to have been responsible for their deaths. Necropsy studies showed some histological change in the adrenal cortex of both patients, but in case 2 the blood-pressure had remained slightly elevated till death, and in case 1 it did not fall till shortly before death, after the presence of hypothermia had been established. In neither case was there any response to intravenous hydrocortisone. Though patients suffering from steatorrhœa may show delay in disposal of a water load (Wollaeger and Scribner 1951) there is no evidence that this results from a hypoadrenocortical state. We do not feel that adrenal cortical failure contributed to the death of our patients. Intravenous triiodothyronine failed to influence the state of either, and the convulsion during the hypothermic phase of case 1 was not affected by intravenous calcium gluconate. In fact, warming was the only measure of any value, producing by itself temporary improvement on two occasions in case 2 (fig. 2).

Probably the resetting of the temperature-regulating mechanism of the body at a lower level, which also occurs in hypothyroid and hypopituitary states, makes the patient much more vulnerable to cold. One of our patients was faced with unexpected low environmental temperature when allowed out of hospital for a few days at Easter; the other became hypothermic spontaneously while under close observation in hospital. Mickerson (1960) has commented on the occurrence of hypopituitarism in steatorrhœa, and hypothermic coma is known to result both from hypopituitarism (Sheehan and Summers 1952) and from hypothyroidism (Clinical Society of London 1888, Marshall and McCaughey 1956, Angel and Sash 1960). The hypothermic deaths of our patients probably took place because of hypofunction of either the pituitary or the thyroid gland, or both, though we have no direct evidence. Clearly, further pathological studies will be needed to resolve this issue. A contributory factor in both was the almost complete absence of subcutaneous fat.

For some while before death, their body temperatures varied around 95–97°F. This feature may serve as a warning of the danger of a more severe hypothermia. We would like to underline the need for the use of special thermometers if hypothermic states are not to be overlooked. Exposure to cold is to be avoided in such circumstances.

Summary

2 patients, known to have been suffering from steatorrhœa throughout their lives, died unexpectedly in hospital. The cause of death was believed to have been hypothermia.

We emphasise that hypothermia cannot easily be detected when ordinary clinical thermometers are used.

Avoidance of exposure to cold seems a sensible precaution in patients with steatorrhœa who are found to have low temperatures.

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"POSTCARDIOTOMY SYNDROME", ANTICOAGULANTS, AND HÆMOPERICARDIUM

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REDUCTION of the clotting power of the blood with phenindione (' Dindevan ') and related drugs is a common clinical procedure of established value. The normal hazards are well known, but in non-surgical conditions an effective and safe therapeutic response is achieved when the patient's prothrombin-time exceeds the control prothrombin-time by 2 to 2·5 times.

In most thoracic centres anticoagulants are an important adjuvant in certain types of heart surgery, especially mitral valve disease with atrial thrombosis with or without pulmonary hypertension. Hæmorrhage from the wound or elsewhere has not proved a problem, provided dosage is carefully controlled and a lower " prothrombin-ratio " of 1·5 to 2 is maintained.

The following case is reported because anticoagulant treatment, given for the " postcardiotomy syndrome " (Soloff et al. 1953), was apparently responsible for severe hæmorrhage into the pericardium. A patient recovering from mitral valvotomy began a course of phenindione on the 12th day after operation because of calf-vein thrombosis. Severe hæmorrhage into the pericardial and pleural cavities resulted. The features of the postcardiotomy syndrome were also present, and this may have been the basic cause of the hæmorrhage.

This condition seems to resemble the dangerous hæmopericardium which may result from the use of anticoagulants in the syndrome following myocardial infarction (Dressler 1957).

Case-report

A district midwife, aged 37, was admitted on April 14, 1960. She gave a history of slowly progressive effort dyspnœa for 7 years, but was only moderately disabled. There were physical signs of pure mitral stenosis with sinus rhythm, a pliant valve, and slight pulmonary hypertension. The murmur filled the whole of diastole at rest.

Radiographs showed slight enlargement of heart in transverse diameter with moderate enlargement of left atrium and fullness of the right ventricle. There was slight to moderate pulmonary venous hypertension. The electrocardiogram was within normal limits, except for showing bifid P waves.

Mitral valvotomy was performed by Mr. Dillwyn Thomas on May 4. The atrial appendage was small and there was no atrial thrombosis. The mitral orifice was small and barely admitted the tip of the index finger. The orifice was first dilated with the finger, and then fully split with a Dubost dilator inserted through the left atrium. Only very slight mitral regurgitation could be felt internally after the valvotomy.

The early postoperative period was uneventful. 6 days after operation the patient had slight pain in the left knee and calf; and on the 9th day after operation there were definite signs of a left calf-vein thrombosis. A soft pericardial rub was noted. The hæmoglobin was 81% (12 g.) and she was apyrexial. Anticoagulant therapy with phenindione (dindevan) was started and prothrombin estimations were done daily at first and thereafter every 2nd day. On the 16th day after operation she had a fairly widespread pericardial friction rub and the postoperative left pleural effusion had become larger. The temperature ranged from 100 to 101°F. The combination of these features strongly suggested the postcardiotomy syndrome. This diagnosis seemed even more probable when, 3 days later, she had substernal and left-sided pleuritic pain and a more extensive pericardial rub. The jugular venous pressure was then slightly raised and the liver was palpable two fingerbreadths below the right costal margin. X-ray showed moderate increase in size of the heart shadow and a fairly large left pleural effusion.

On May 27, 23 days after operation, the patient's condition rapidly deteriorated. She had severe oliguria, nausea, and frequent vomiting, and was very apprehensive. The chest pain was less severe. The pulse was of very small volume (rate 110 per min.) and was regular. There was no definite paradoxical element. The blood-pressure (B.P.) was 90/77 mm. Hg. Jugular venous pressure above the sternal angle and with the patient at 60° was +8 cm., and there was little pulsation. The liver was enlarged four fingerbreadths and was non-pulsatile. The heart sounds were faint and the rub was absent. There was slight œdema and a large left pleural effusion.

Chest X-ray showed further enlargement of the heart shadow and a considerable increase in the left pleural effusion.

Cardiac tamponade was diagnosed and 5 oz. of heavily bloodstained fluid (Hb 40%) was recovered from the pericardial sac. An impressive and rapid improvement followed. The jugular venous pressure fell considerably and increased pulsation was apparent. The B.P. was now 110/80 mm. and the pulse volume was much improved. The patient's hæmoglobin was then 72% (10·6 g.), and 2 days later the hæmoglobin was 65% (9·6 g.), hæmatocrit value 32%. Phenindione was immediately stopped and vitamin K_1 20 mg. was given orally and intravenously. 2 days later 20 oz. of heavily bloodstained fluid was removed from the left pleural cavity and a further 16 oz. was aspirated 3 days later. All aspirates remained sterile on culture.

Thereafter the patient improved steadily and remained apyrexial. The heart shadow became progressively smaller and the left pleural effusion rapidly decreased. On discharge 7 weeks after operation she was very well and when seen as an outpatient on July 19, 1960, she had an almost clear left costophrenic angle and the heart shadow had returned to its preoperative size.

Discussion

At no time did the patient's prothrombin-time exceed a maximum of 2·7 times the control figure, and under normal conditions bleeding would not be expected.

The patient appears, however, to have had the postcardiotomy syndrome. This syndrome is characterised by pyrexia, pericarditis, and left pleural effusion, and is variously quoted as occurring in 10–24% of patients, 10 days to 4 weeks after mitral valvotomy (Soloff et al. 1953, Bercu 1953, Papp and Zion 1956, Wood 1954). It also arises after other heart operations, including those for congenital heart-lesions. Relapses are not unusual and may continue for many months after operation.

The cause of the syndrome is not definitely known. Its appearance after operation for congenital heart-lesions argues against the American view that the syndrome represents an exacerbation of rheumatic activity. It may be a non-specific reaction, resulting from slight oozing of blood from the atriotomy wound, or it may represent a sensitisation phenomenon to the products of myocardial necrosis. A low-grade infection may sometimes be the explanation, but fluid aspirates are usually sterile on culture.

Dressler (1956) described an apparently similar syndrome following myocardial infarction. In about 3% of patients generalised pericarditis, pleural effusion, and pneumonitis appear from 1 to several weeks after the infarction. Again there is a tendency to relapse. Prognosis is favourable, but anticoagulants have been started or

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recommenced on the grounds of further myocardial infarction. Dressler (1956) reports at least one patient in whom hæmopericardium and fatal cardiac tamponade took place after anticoagulants, and states that anticoagulants are contraindicated. There is also the possibility that there may be spontaneous hæmorrhage.

A reasonable assumption is that in these syndromes the local inflammatory reaction in the respective serous membranes should have a tendency to bleed, especially if anticoagulants are used. This also applies to any acute pericarditis.

Summary

A case is reported in which dangerous hæmorrhage into the pericardium and pleura resulted from the use of anticoagulant drugs for calf-vein thrombosis in the presence of the " postcardiotomy syndrome ".

In the light of this case, anticoagulant therapy seems to be contraindicated if the features of the postcardiotomy syndrome develop after heart surgery.

I should like to acknowledge the help and encouragement given by Dr. H. M. Foreman.

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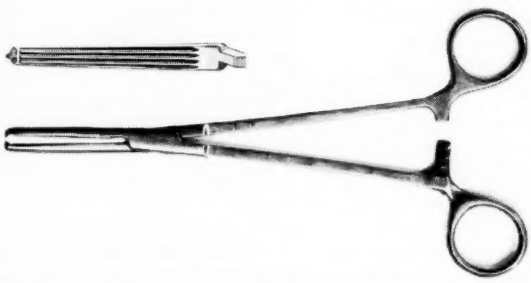
New Inventions

A HYSTERECTOMY CLAMP

AT Hammersmith Hospital we have evolved a new type of hysterectomy clamp, which has now been in use for two years. In our hands it has proved superior to the ones hitherto employed.

This clamp is made in both curved and straight forms. It has a box-type joint, and is made in stainless steel. Being fairly heavy, and thus having less spring than lighter types, it does



Straight hysterectomy clamp, showing longitudinal grooving of the jaws (inset).

not permit the escape of tissue even when large bits are taken. The jaws are deeply grooved longitudinally to provide a better grip on the enclosed tissue (see figure).

Measurements of the two clamps are:

	Straight	*Curved*
Length overall	21·5 cm.	24·5 cm.
Length of jaw	5·0 cm.	6·5 cm.
Length of serration	4·75 cm.	5·0 cm.
Weight	90 g.	110 g.

The clamp is manufactured for us by Messrs. Murphy Boyle, Ltd., 69, Wimpole Street, London, W.1.

Institute of Obstetrics and Gynæcology, Hammersmith Hospital, London, W.12

J. C. MCCLURE BROWNE
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Reviews of Books

The Chemistry of Lipids in Health and Disease

H. K. KING, M.A., PH.D., F.R.I.C., senior lecturer in biochemistry, University of Liverpool. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1960. Pp. 104. 30*s*.

MOST of our readers must have been taught at one time the elementary principles of fat metabolism, but the advances in the subject have been rapid, particularly in recent years, and the specialised monographs have become harder and harder to read. This is a book for those who have neither the time nor the training to do so. It begins with the physics and chemistry of the water-lipid interfaces and goes on to describe with clear chemical formulæ and diagrams the structure and metabolism of the fats and sterols. The mysteries of the phosphatides, the shape and form of the essential fatty acids, of β-carotene, and of many of the compounds which have become mere names to most of us are then discussed. Next comes a description of the synthesis of these compounds in vivo, of their place in our food, and of their role in atherosclerosis. There are a few unobtrusive references at the end of each chapter, mostly to reviews. Parts of the book will appeal more to some than to others, but the whole is engagingly simple and informative. It may be recommended with confidence to all who have lost their grip on lipids and lipid metabolism. The dose to be prescribed is one chapter per day to be read, preferably before food, with thought and attention. The effects will be excellent.

Psyche und Hormon

HEINRICH MENG, M.D. Berne and Stuttgart: Hans Huber. 1960. Pp. 486. DM. 78.

THE formidable subtitle reads: Introduction into Endocrine Psychosomatics, Clinical Psychoanalysis and the Theory of Stress. The larger part of the book has been written by Professor Meng, who until recently held the chair of mental hygiene in the University of Basle. Hans Selye contributed a chapter on the present state of his theory of stress. C. A. Joël and F. G. Sulman wrote an excellent introduction to endocrinology with special emphasis on psychosomatic aspects. There is also a report on the successful psychoanalytic treatment of a sexual pervert by Paul Parin. The chief author, who is the doyen of psychoanalysis on the Continent, has for many years striven for the integration of psychoanalysis with neuropsychiatry and general medicine. This well-produced book presents a wealth of knowledge relevant to the relationship of psychoanalysis to endocrinology. Freud, who never wavered in his biological approach to psychology and psychopathology, would have thoroughly approved of both the orientation of the book and the presentation of the material.

The Doctors of Yale College 1702-1815 and the Founding of the Medical Institution

HERBERT THOMS, M.D., professor emeritus of obstetrics and gynæcology, and curator, Yale Medical Memorabilia, Yale University. Hamden, Connecticut: Shoestring Press. London: Mark Paterson. 1960. Pp. 199. 50*s*.

THIS important historical contribution lists for the first time all the graduates of Yale College from 1712 to 1815 who practised medicine. There are 23 long and 22 short biographies. Only a handful ever attended a medical school: nearly all served an apprenticeship with an experienced physician. Later, they in their turn instructed young men in caring for the sick and guarding the well. The early examples were cleric-physicians—for instance, Jonathan Dickinson (1688–1748) of the class of 1706 who became a minister and practised medicine. He published in 1740 a pamphlet entitled *Observations in that terrible Disease vulgarly called The Throat Distemper*—presumably diphtheria. The most interesting point is that he performed necropsies in order to become better acquainted with the pathology of the condition.

" Being called to visit the distressed Family, I found upon my arrival, one of the Children newly dead, which gave me the Advantage

of a Dissection, and thereby a better Acquaintance with the Nature of the Disease, than I could otherwise have had: From which (and other like) Observations, I came pretty early into the Methods of Cure that I have not seen reason to change."

Dickinson eventually helped to found Princeton and was its first president. The story includes the foundation of the Medical Institution of Yale College by Timothy Dwight. There are many portraits and other illustrations.

Annual Review of Microbiology

Vol. 14. Editor: CHARLES E. CLIFTON, Stanford University. Associate editors: SIDNEY RAFFEL, Stanford University, MORTIMER P. STARR, University of California. Palo Alto, California: Annual Reviews. 1960. Pp. 391. $7.

THIS new volume in this excellent series contains seventeen contributions, ranging from the energy metabolism in chemolithotropic bacteria to variation in phytopathogenic fungi; they vary in standard but all fulfil the primary need for up-to-date and well-documented commentaries on recent advances. Of particular interest to doctors are reviews on airborne infections, the arbor viruses, the mechanism of antibody synthesis, precipitin tests, and pleuropneumonia-like organisms.

A chapter on intramural spread of bacteria and viruses in human populations, by R. E. O. Williams, is a selective review of bacterial airborne infections in the main, and thoroughly discusses bacterial air-sampling devices and the importance of the size of particle in airborne spread. A valuable part of the chapter deals with air disinfectants, and Professor Williams concludes that at present no method is of much practical value in clinical work. There is less discussion on the mechanisms of infection than on the mechanisms of dissemination. The relation between the size of the infecting particles and the site in the body where infection takes place is described in some detail, but much uncertainty on the size of the infective dose, the death-rate of pathogens under normal conditions, and the virulence of surviving bacteria leaves unsolved the question of how infective agents invade the body after airborne spread.

R. E. Kissling, of the United States Public Health Service, gives a complete review of the arthropod-borne viruses, which now number more than fifty, and are worldwide in their distribution and very varied in their clinical manifestations. Recent work on Western equine encephalitis has shown that the virus may survive for long periods in mosquitoes, and possibly this is how the virus lasts the winter. Eastern equine encephalitis seems to be maintained by endemic foci in freshwater swamps, and in both infections birds and mosquitoes play a large part in maintaining the reservoir of disease. A similar pattern is emerging with several of the other arbor viruses (for example, Japanese B encephalitis, St. Louis encephalitis, and West Nile virus). Recent changes in the epidemiology of yellow fever are well discussed, and there is a section on the poorly known tick-borne viruses.

Under the title " immunological speculations " N. K. Jerne, of the World Health Organisation, discusses how the specificity of the antibody is controlled by the administered antigen. A rather formidable new terminology is introduced to express more precisely the concepts involved. Five of the major theories are discussed at length—those of Burnet, Lederberg, Monod, Boyden, and Jerne himself. Another aspect of immunology is examined by Alfred J. Crowle, of the University of Colorado, in a chapter on the interpretation of immunodiffusion tests. These tests are now widely used, and too little attention has been paid to the possible misinterpretations of the patterns of precipitin lines which they yield. A helpful introduction on the precipitin reaction is followed by a discussion of the effect of the gel and the medium, the formation of multiple lines of precipitate by one antigen, and the heterogeneity of antibody molecules.

H. E. Adler and Moshé Shifrine, of the University of California, writing on the nutrition, metabolism, and pathogenicity of mycoplasmas, review some interesting work on the pleuropneumonia-like organisms. These have attracted interest lately because of their relation to diseases of the urogenital tract. They are unusual in having an absolute requirement for sterols as a growth-factor. Although their pathogenicity for man is uncertain, their very varied effects in animals and the considerable influence of various stressing factors make for caution in deciding on this too dogmatically.

Other subjects include microbial nutrition (H. C. Lichstein), the fine structure of virus-infected cells (H. M. Rose and C. Morgan), protein synthesis in bacteria (G. D. Novelli), enzyme localisation in bacteria (A. G. Marr), in-vitro cell-virus relationships resulting in cell death (D. L. Walker), and the mechanism of gene action (C. Yanofsky and P. St. Lawrence); and all will be valuable to specialists. The volume, well printed and well indexed, is a worthy successor to the earlier numbers.

The Principles and Practice of Refraction

G. H. GILES, O.B.E., F.B.O.A. (hon.), F.S.M.C., D.ORTH., consultant, Incorporated Thames Nautical Training College (H.M.S. *Worcester*). London: Hammond, Hammond & Co. 1960. Pp. 688. 126*s*.

THIS book by an ophthalmic optician of considerable experience contains much more than the principles and practice of refraction. The first section deals with refractive error and its correction, the second with examination of the visual fields and the clinical testing of colour vision, and the third with orthoptic investigation and treatment. The fourth is a composite section, including the use of drugs in ophthalmic optical practice, the use of instruments for special examination, the correction of refractive errors by contact lenses, aniseikonia, and, finally, the principle of dispensing spectacles.

Excellent as the book is judged by the information in it, it might have been more valuable to the practising ophthalmic optician if it had been confined to its title. It is questionable whether the brief section of 87 pages on orthoptic treatment is sufficiently comprehensive for anyone wishing to practise orthoptics, provided, of course, it is conceded that ophthalmic opticians have the necessary experience to enable them to do so. Again, the use of drugs by those without medical knowledge may be fraught with danger, and the same comment may apply to the fitting of contact glasses and the use of the tonometer to estimate ocular tension.

It could be argued that ophthalmic opticians should confine themselves to the work for which their training very ably fits them—the detection and treatment of refractive errors by means of appropriate spectacles, and the detection (no more) of " departures from the normal " in the eyes and adnexa. Ophthalmology is a fascinating subject, and the ophthalmic optician with an inquiring mind will often be tempted to carry out such investigations as examination of the visual fields (the section on visual fields in this book is well written and contains much practical information); but he can seldom be justified in giving treatment and advice about the anomalies he may discover. Perhaps those ophthalmic opticians who seek work other than pure refraction will in time find posts in National Health Service hospitals where they will be able to work under the direction of an ophthalmic surgeon.

This book has been carefully written, it is well produced, and the illustrations are first-rate. The author and the publishers are to be congratulated.

The Nervous System

An Outline of the Structure and Function of the Human Nervous System and Sense Organs. G. M. WYBURN, F.R.F.P.S., professor of anatomy, University of Glasgow. London and New York: Academic Press. 1960. Pp. 184. 35*s*.

THIS simple introductory book sets out to give a straightforward description of the structure and function of the nervous system. It should be most valuable to medical students who need a bird's-eye view at the beginning of their study of anatomy and physiology, and it will certainly be helpful to psychologists and medical auxiliaries who also need a fairly simple outline of the nervous system and how it works. There are a number of clear line drawings, and a well-selected short bibliography of important books and papers at the end of each chapter. Considering the readers for whom the book is written, it is a pity the price is so high.

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Neurogenic Hypertension

THE idea that the cause of essential hypertension may lie in the brain has been out of fashion in the Western world for many years. The failure to demonstrate an increase in neurogenic tone to the arterioles, and the failure of total sympathectomy to cure essential hypertension, seemed convincing evidence that the autonomic nervous system was not involved in maintaining the increased peripheral resistance. On the other hand, neither of these observations proves that the sympathetic nerves do not participate in initiating hypertension. The view that essential hypertension has a neurogenic basis is now attracting renewed interest. The beneficial effect of hypotensive drugs which act by inhibiting autonomic vasoconstriction has convinced many workers that a nervous component helps to maintain essential hypertension, and some workers believe that such a component is important in causation.[1] Interest has been further stimulated by reports of Russian research.[2 3]

The chief reflex centre for blood-pressure control is generally thought to be the vasomotor centre in the medulla oblongata; but the activity of this centre can be affected by the hypothalamus and cerebral cortex, and abnormal influences at any of these levels might theoretically give rise to hypertension. In Russia attention has long been focused on the cerebral cortex; and essential hypertension is regarded as a cardiovascular neurosis initiated by disturbance of the normal inhibitory effect of the cerebral cortex on the hypothalamic vasomotor centres.[2] DICKINSON and THOMSON [4] have now turned attention back to the medullary vasomotor centre. As long ago as 1925, STARLING [5] contended that the key to the origin of essential hypertension might be found here: "No pathology will be adequate", he said, "which does not take into account the sensitiveness of the vasomotor centre to the changes in the circulation through it, which determine the height at which the arterial blood pressure is set." STARLING suggested that, with narrowing of the carotid and vertebral arteries supplying the circle of Willis, or disease of the small arteries to the vasomotor centre, a normal blood-pressure would be insufficient to supply the needs of the centre, and the pressure would be raised. The discovery of the carotid baroreceptors a few years later [6] undermined Starling's experimental evidence, and his hypothesis passed into oblivion. Later work showed that in dogs ligation of the main cerebral arteries might raise the blood-pressure, but the results were not very striking. In rabbits, however, where the cerebral circulation more closely resembles that of man, elevation of the blood-pressure has been consistently produced by ligation of the main cerebral arteries—even when the ligation is distal to the carotid sinus, so excluding any effects of baroreceptor interference.[7–9] Moreover, patients who die from strokes commonly have atheromatous narrowing of the carotid and vertebral arteries[10]; and in such cases hypertension is not unusual.

DICKINSON and THOMSON[4] set out to test the hypothesis that essential hypertension is caused by reduction in the blood-carrying capacity of the main cerebral arteries, and particularly the vertebral arteries. They investigated post mortem a series of 80 subjects with wide ranges of age and blood-pressure, perfusing each carotid and each vertebral artery in turn after removal of the brain, using a constant head of pressure, and determining the volume flow from the distal ends of the vessels per unit time. In order to estimate the degree of atheroma in other parts of the body, they also perfused the femoral arteries and measured the internal diameter of the two main renal arteries. This investigation showed a very close association between the antemortem level of blood-pressure and the fluid-carrying capacity of the vertebral arteries. A lesser, but none the less definite, association with blood-pressure was apparent for the internal carotid arteries, and also for the intracranial arteries where the atheroma was graded by eye. The association was relatively slight for the main renal arteries and almost non-existent for the femoral arteries.

If atheroma were the result of hypertension, it is difficult to understand why the vertebral arteries should be picked out in this way. On the other hand, the evidence is consistent with the view that narrowing of the vertebral arteries causes hypertension. The acid test of this hypothesis must be a comparison between the findings in primary and in secondary hypertension. The series included 13 cases of chronic renal disease. When these were separated from the remainder, and the relation between mean blood-pressure and vertebral-artery fluid-carrying capacity was determined for the renal and non-renal groups separately, there was no appreciable difference in the slope of the regression lines, indicating that in both groups a given reduction in vertebral arterial flow was associated with a similar rise in blood-pressure. There was, however, a significant difference in the position of the lines, showing that patients with chronic renal disease have a greater vertebral-artery fluid-carrying capacity than patients with the same blood-pressure who are free of renal disease.

What are we to conclude from this? DICKINSON and THOMSON infer that narrowing of the arteries to the brain may be a cause as well as an effect of hyper-

1. Paton, W. D. M. *in* Hypertension (edited by J. Moyer). Philadelphia, 1959. Dickinson, C. J., Thomson, A. D. *Lancet*, 1959, ii, 46. Brod, J. *ibid.* 1960, iii, 773.
2. Simonson, E., Brozek, J. *Ann. intern. Med.* 1959, **50**, 129.
3. Wilson, C. *Lancet*, 1960, ii, 1077.
4. Dickinson, C. J., Thomson, A. D. *Clin. Sci.* 1960, **19**, 513.
5. Starling, E. H. *Brit. med. J.* 1925, ii, 1163.
6. Heymans, C. Le sinus carotidien et les autres zones vasosensibles réflexogènes. Paris and London, 1929.
7. Rosenfeld, S. *Amer. J. Physiol.* 1952, **169**, 733.
8. Rosenfeld, S., Thomas, H. V., Drury, D. R. *ibid.* 1954, **178**, 392.
9. Rothman, S. *ibid.* 1955, **180**, 61.
10. Hutchinson, E. C., Yates, P. O. *Lancet*, 1957, i, 2.

tension. Alternatively, the finding of less narrowing in the renal cases must be explained in some other way —possibly shorter duration of hypertension in these cases. Whatever the answer, this work represents an important contribution to our knowledge of hypertensive vascular disease, and a provocative contribution to current thought on the cause of essential hypertension.

Fibrinolysin for Thrombosis

FIBRINOLYSIN that can be used in the treatment of thrombosis is a recent introduction.[1] It is a complex of streptokinase and plasminogen, of which two commercial preparations are available: 'Actase' and 'Thrombolysin'. CLIFFTON [2] reports that in practice thrombolysin has proved to be the better. Reactions with these substances were at first very troublesome; fever, nausea, vomiting, muscle pains, and headache were common. The reactions were found to be due to the streptokinase; but purification of the streptokinase, though difficult, has been greatly improved, and CLIFFTON [3] has reported that with thrombolysin reactions occurred in only 8% of patients and were relatively mild. With this purified material excellent activity can be obtained and safely maintained. To be effective, fibrinolytic enzyme must be given as soon as possible after the thrombosis; CLIFFTON states that in arterial thrombosis treatment should be started within eight hours of onset, and that venous thrombi must be treated within the first three days. If the fibrinolysin is given systemically, it is infused intravenously in order to keep up fibrinolytic activity for about six hours with venous thrombosis and for eight to twelve hours with arterial thrombosis; but arterial thrombosis is probably better treated by direct application to the site. CLIFFTON [2] describes a method for determining the effective dose—a determination that has to be carried out for each patient, owing to individual variation.

The patient's plasma is added to standard dilutions of the fibrinolysin, and the amount of fibrinolysin in units that will cause lysis of the patient's plasma-clot in thirty minutes is recorded. This amount multiplied by the estimated plasma-volume gives the amount of fibrinolysin to be delivered in four hours; usually half this amount is given in the first hour, and the rest divided into hourly doses.

If excessive fibrinolytic activity develops, hæmorrhage may occur. Fortunately the activity soon diminishes when infusion of fibrinolysin is stopped, and, if the bleeding is serious, it can be rapidly and safely inhibited by ε-aminocaproic acid.[3] There is another practical safeguard: fibrinolysins depress the activity of prothrombin, factor V, and factor VII in addition to fibrinogen [4 5]; and this depression can be followed by means of the one-stage prothrombin-time test—a test that is carried out with reasonable accuracy in most hospital laboratories. CLIFFTON suggests that the prothrombin-time should be checked hourly during fibrinolysin infusion, and that, if the test time rises above twenty-five seconds, the infusion should be stopped.

ANLYAN et al.,[6] who administered fibrinolysin in cases of surgical thrombosis, used the prothrombin-time to control the dose given: fibrinolysin is infused until the prothrombin level is reduced to about 40%; the level is checked hourly, and enough fibrinolysin is given to keep the level between 35 and 40%.

The best results with fibrinolysin have been obtained in the treatment of thrombosis of peripheral blood-vessels. ANLYAN et al.[6] have reported results in 37 cases —15 of venous and 22 of arterial thrombosis. If there were good indications for embolectomy or surgical removal of thrombus, these operations were carried out and in addition fibrinolysin was given. The doses of thrombolysin needed to lower the prothrombin level to 35–40% and to hold it there proved to be between 150,000 and 200,000 units initially, with a further similar amount four-hourly. When veins in the limbs were affected, the fibrinolysin was infused into a distal vein of the affected limb. The 15 venous cases included some of idiopathic, post-traumatic, and postoperative deep-venous thrombosis, and 1 of superficial thrombosis of the brachiocephalic vein; in 1 patient, in whom massive venous thrombosis developed in a leg six days after a cardiac operation, thrombectomy through the common femoral vein was carried out. The 16 arterial cases included 10 of femoropopliteal thrombosis; in 1 patient with retinal thrombosis the arterial circulation was completely restored within twenty-four hours of the start of treatment; but, as the treatment began six hours after onset, sight did not return. ANLYAN et al. consider that most of their patients benefited from the treatment "with salvage of entire limbs or significant portions thereof". They suggest that fibrinolysin should be infused for forty-eight hours, after which heparin 25–35 mg. should be given every four hours for about a week. With other forms of thrombosis—especially coronary and cerebral—the results are much less certain. BOLTON et al.[7] showed that in the dog an experimental coronary thrombus could be removed by infusion of fibrinolysin. BOYLES [8] infused thrombolysin in 3 cases of coronary thrombosis and concluded that the serum-transaminase levels and the electrocardiograph patterns returned to normal more quickly than expected; the fibrinolysin infusions were followed by administration of anticoagulants.

The results of fibrinolysin therapy so far suggest that it is worth trying in cases of acute thromboembolism of the limb veins and, combined with surgery, in cases of arterial thromboembolism. The value of fibrinolysin in coronary and cerebral thrombosis is still doubtful. An important difficulty is that second courses of fibrinolysin given a few days after the first may result in severe reactions and must therefore be avoided.[5]

Whatever the value of fibrinolysin may prove to be, the need for anticoagulant treatment with coumarin drugs continues. It should not be thought that coumarin drugs act only by general prevention of blood-clotting; there is evidence that they have an antithrombotic activity

1. See *Lancet*, 1958, ii, 624; *ibid.* 1960, ii, 1433.
2. Cliffton, E. E. *J. Amer. med. Ass.* 1961, **175**, 302.
3. Nilsson, I. M., Sjoerdsma, A., Waldenström, J. *Lancet*, 1960, i, 1322.
4. Cliffton, E. E. *Amer. J. Cardiol.* 1960, **6**, 476.
5. Ambrus, J. L., et al. *ibid.* p. 462.
6. Anlyan, W. G., Silver, D., Denton, H. L., Fort, L., Webster, J. L. *J. Amer. med. Ass.* 1961, **175**, 290.
7. Bolton, H. E., Tapia, F. A., Cabral, H., Riera, R., Mazel, M. *ibid.* p. 307.
8. Boyles, P. W. *ibid.* p. 279.

that can help to prevent the beginning of new clots on damaged areas of vessel walls. DOUGLAS [9] suggested that they might act by controlling intrinsic thromboplastin formation. HOAK et al.[10] have studied the clotting mechanism in 28 patients who were regularly receiving either dicoumarol or warfarin. They found that in 26 out of 28 patients the clotting-time of blood in siliconed tubes was significantly prolonged, and that this prolongation was correlated with abnormal results of the thromboplastin-generation test indicating poor thromboplastin formation. There was no consistent correlation with factor-VII or prothrombin levels. This observation by HOAK et al. is interesting because WESSLER and REINER,[11] in animal studies, have found that intravascular thrombosis is lessened when thromboplastin generation is depressed. So there is some laboratory and experimental support for the idea that coumarin treatment helps to prevent further thrombosis. The place of fibrinolysin is in the treatment to be given in the first few hours after the vessel has been blocked.

More Virus Inhibitors

ONE of the best-known achievements of modern virology is the discovery that the influenza virus and other myxoviruses attach themselves to a specific grouping on the mucoproteins of cell surfaces, and that they have an enzyme by which they can release themselves again; this enzyme, now called neuraminidase,[12] splits off sialic acid from the specific virus receptor. Sialic acid is contained in certain gangliosides, extracted from brain, which combine with tetanus toxin and with influenza virus.[13 14] The amount of tetanus toxin fixed is proportional to the amount of sialic acid in each ganglioside, but the amount of influenza virus fixed is not. Another substance, ovomucin, which contains sialic acid combines readily with virus but does not fix tetanus toxin at all.[14] Clearly, therefore, the receptor activity of sialic acid depends on the way it is built into the molecular structure.

Chemical groupings reacting with viruses also occur in proteins contained in many body-fluids; combination of viruses with these may prove a nuisance in serological tests as such complexes are no longer free to combine with red blood-cells, and so these "receptors in solution" may appear as non-specific (i.e., non-antibody) inhibitors of hæmagglutination. They are in fact highly specific inhibitors, for some viruses react more readily with inhibitor from one source than with that from another, and it seems that this pattern may be correlated with the exact chemical structure of the prosthetic groups.[15] These inhibitory mucoproteins (α-inhibitors) do not neutralise the infectivity of influenza viruses. Certain sera also contain proteins which inhibit the infectivity as well as the hæmagglutinin activity of certain influenza viruses, particularly A1 strains not adapted to growth in mice. Inhibitors of this second class (β-inhibitors) somewhat resemble properdin,[16] but the chemical properties of the protein fractions in which they are found differ from those of properdin.[17 18]

When strains of Asian (A2) influenza virus were studied in the laboratory they could be divided into two groups by their reaction with non-specific inhibitors. The first group (avid strains [19–21]) reacted with hitherto unrecognised inhibitory substances, found in especially high titres in horse sera, and also with a receptor substance on red cells, which, like the inhibitor, was not inactivated by neuraminidase. Virus strains in the second group (non-avid) did not react in this way [19–22]; as might be expected, they eluted from red cells much more freely than the other type.[22 23] The properties of the two groups of strains were found to depend on which of two types of virus particle predominated in them [11]—type "+" confined avidity, and type "—" non-avidity. Avid virus particles are neutralised by normal serum, which can be used to select "non-avid" particles or to protect mice from infection with avid strains.[22 24 25] Electrophoresis [26 27] and precipitation [28 29] methods have revealed that the inhibitor of avid influenza A2 strains is contained in specific serum fractions. Slight inhibitory activity has been found in the fast-moving γ-globulin fraction of horse-serum.[30] Much of the inhibitory activity is found in the "acid serum-glycoprotein" fraction, which in human sera contains α-inhibitor activity. (It cannot be assumed that all the acid glycoprotein is inhibitor, for in human serum the α-inhibitor is apparently only a small fraction of the total acid glycoprotein.[31]) Administration of neuraminidase releases about 50% of the total sialic acid of an active purified horse-serum acid-glycoprotein fraction, and the virus inhibiting and neutralising activity is unchanged.[30] It may be concluded, therefore, that the inhibitor and the avid virus combine through a grouping which is not attacked by the virus enzyme; as a result the virus cannot get free again to attack a cell and is therefore non-infectious. When α-inhibitors are chemically treated so that they can still combine with virus but are not attacked by the enzyme, the same effect is produced and these inhibitors become able to neutralise the virus.[32 33]

Laboratory study of "non-avid" strains of influenza A2 virus has revealed the presence of a rather different inhibitory substance. When mice were immunised against Asian influenza and the sera were tested with non-avid virus, the first antibody to appear was detect-

9. Douglas, A. S. *Brit. med. Bull.* 1955, **11**, 39.
10. Hoak, J. C., Connor, W. E., Warner, E. D., Carter, J. R. *Ann. intern. Med.* 1961, **54**, 73.
11. Wessler, S., Reiner, S. *J. clin. Invest.* 1960, **39**, 262.
12. Gottschalk, A. *Biochim. biophys. Acta*, 1957, **23**, 645.
13. Bogoch, S. *Virology*, 1957, **4**, 458.
14. Bernheimer, A. W., van Heynigen, W. E. *J. gen. Microbiol.* 1961, **24**, 121.
15. Gottschalk, A., Fazekas de St. Groth, S. *ibid.* 1960, **22**, 690.
16. Ginsberg, H. S., Wedgewood, R. J. *Ann. N.Y. Acad. Sci.* 1956, **66**, 251.
17. Konno, J. *Tohoku J. exp. Med.* 1958, **67**, 391.
18. Poliak, R. I. *Probl. Virol.* 1960, **5**, 68.
19. Zhdanov, V. M., Zakstelskaya, L. J., Yefimova, V. E., Yachno, M. H., Khait, S. L. *J. Amer. med. Ass.* 1958, **167**, 1469.
20. Takátsy, G., Barb, K. *Nature, Lond.* 1959, **183**, 52.
21. Luzyanina, T. I., Salminen, A. L., Smorodintsev, A. A. *Acta virol.* 1960, **4**, 137.
22. Choppin, P. W., Tamm, I. *J. exp. Med.* 1960, **112**, 895, 921. Choppin, P. W., Murphy, J. S., Tamm, I. *ibid.* p. 945.
23. Yakhno, M. A., Zakstelskaia, L. I., Zhdanov, V. M. *Probl. Virol*, 1959, **4**, 10.
24. Cohen, A., Belyavin, G. *Virology*, 1959, **7**, 59.
25. Cohen, A. *Lancet*, 1960, ii, 791.
26. Levy, A. H., Norman, P. S., Wagner, R. R. *Fed. Proc.* 1959, **18**, 588.
27. Polyak, R. J., Smorodintseff, A. A. *Acta virol.* 1961, **5**, 1.
28. Hána, L., Styk, B., Kočišková, D. *ibid.* 1960, **4**, 356.
29. Križanová-Laučíkova, O., Szánto, J., Kočišková, D. *ibid.* 1961, **5**, 4.
30. Križanová-Laučíkova, O., Szánto, J., Kočišková, D., Ruttkay-Nedecky, G., Sokol, F. *ibid.* p. 12.
31. Tyrrell, D. A. J. *J. Immunol.* 1954, **72**, 494.
32. Burnet, F. M. *Aust. J. exp. Biol. med. Sci.*, 1948, **24**, 381.
33. Hollos, I. *Nature, Lond.* 1961, **189**, 553.

able only in unheated sera.[34] This was because hæmagglutination was inhibited by antibody only in the presence of a heat-labile cofactor, present in normal and in immune sera. Electrophoresis has revealed that the cofactor migrates with the globulins in the usual buffers [35]: it is apparently not properdin; it may be related to some components of complement.[36]

Tracking down the vagaries of the hæmagglutination-inhibition test has led us to interesting discoveries about the fundamental interactions between viruses and receptors; and in this hunt virologists in Eastern Europe have played an important part.

34. Styk, B., Rathova, Blaskovic, D. *Acta virol.* 1958, **2**, 179.
35. Styk, B., Hána, L. *ibid.* 1960, **4**, 365.
36. Kočišková, D., Styk, B., Hána, L. *ibid.* 1961, **5**, 19.

Annotations

ORGANISATION IN GENERAL PRACTICE

THE symposium and exhibition on Methods and Organisation in General Practice, held at Cambridge on March 25 and 26, presented the New Look in general practice. It was arranged by the East Anglia faculty of the College of General Practitioners and the Cambridge Medical School and was attended by 95 general practitioners.

First, the doctor's surgery was considered. Dr. J. G. Howells pointed out that a warm, welcoming surgery with comfortable chairs and a carpet on the floor does much to make the patient feel at ease; effective sound-proofing is essential, but not at the cost of poor ventilation. As a psychiatrist Dr. Howells introduced two points which many would overlook: the pictures on the walls should not include portraits, since some patients may feel that these intrude on the privacy of the consultation; and patients should not be seated so that the desk is between them and the door, because anxiety may be engendered if they feel that the route of escape is cut off.

The audience was delighted with Mrs. Diana Rowntree's witty observations on waiting-room design. Mrs. Rowntree, an architect, has found through long experience that the waiting-room is a place where a lot of strangers are cooped up together. It should be comfortable, warm, and cheerfully decorated, and contain a focus of interest, such as a fish tank or a doll's house for the children, so that time passes more quickly. The waiting-room should serve a therapeutic function, helping patients to relax before their interview with the doctor.

Dr. J. Nickson described the use of his mobile " caravan surgery ", which offers a valuable service to patients in rural communities. His mobile surgery was on view. Dr. R. P. C. Handfield-Jones described a method by which the general practitioner can provide dry sterile syringes for use in his practice, by means of an electric hot-air oven steriliser.

Mr. T. H. Crossley cited statistics to show the difference that an appointment system can make to a practice, in terms of reducing time lost to the patient, strain on the doctor, and overcrowding in the waiting-room. In a lively discussion general practitioners who had started an appointment system unanimously recommended others to follow their example. Apparently, an appointment system, once tried, is preferred by both patient and doctor: doctors who use such a system agreed that nothing would induce them to abandon it. Dr. P. Walford spoke of the importance of keeping systematic records. He disposed of the common myth that there is not time for record-keeping in practice, explaining that the time saved far outweighs the time taken, and that the busy general practitioner cannot afford to work without careful notes.

The weekend meeting was an unqualified success. And the lessons to be learnt from it? First, ninety-five general practitioners were prepared to give up a fine weekend at the end of a busy winter to consider ways of improving their practices: anyone who still thinks that general practitioners are interested solely in collecting capitation fees would do well to note this. Secondly, several organisations—such as the College of General Practitioners and the Medical Practitioners Union—with wide experience of practice organisation are prepared to advise the doctor. Lastly, general practice would be transformed if there was any financial incentive towards building new surgeries, equipping them with more modern equipment, and employing staff to run an appointment system. The will is there, but the means are hard to find. It is a sad reflection on the present age that radio communication with contraptions in Outer Space is taken for granted, but it is not economic for the family doctor to install a radio telephone between his surgery and his car. The general practitioner cannot claim tax relief on the capital cost of a new surgery: the farmer can on a new cowshed, since this counts as industrial plant. Perhaps this explains why the cowsheds of Britain are more up to date than the doctors' surgeries.

SUBACUTE SPONGIFORM ENCEPHALOPATHY

AN unusual subacute, progressive, cerebral disorder has lately been reviewed by Nevin et al.,[1] who refer to 15 previously reported cases and describe 8 of their own. The earliest examples were recorded by Fischer,[2] Heidenhain,[3] and Hallervorden [4]; and the condition has been discussed by several groups in the past few years. [5–10] Nevin et al. now suggest that this condition is caused by vascular dysfunction, and that it be termed subacute spongiform encephalopathy.

The age at onset is commonly in the sixth or seventh decade; the youngest patient was 38. 3 of Nevin's patients had undergone intracranial operations in the preceding two years, and in a 4th the illness began immediately after the extraction of teeth under nitrous-oxide anæsthesia. The clinical history is often divided into three chapters. In the first stage ingravescent and non-specific symptoms predominate; the second stage is characterised by the rapid progression over three to twelve weeks of cerebral symptoms—particularly dementia, myoclonus, paralysis, speech disturbance, and cortical blindness, with increasing dementia and myoclonic movements dominating the clinical scene. In the third and terminal phase the involuntary movements gradually subside and the patient becomes stuporose and immobile. In the whole series the average duration of the illness was fourteen weeks. Probably the active process never occupies more than six months, although the patient may

1. Nevin, S., McMenemey, W. H., Behrman, S., Jones, D. P. *Brain*, 1960, **83**, 519.
2. Fischer, O. *Z. ges. Neurol. Psychiat.* 1911, **7**, 1.
3. Heidenhain, A. *ibid.* 1928, **118**, 49.
4. Hallervorden, J. *in* Handbuch der Geisteskrankenheiten (edited by O. Bumke); vol. II, p. 1094. Berlin, 1930.
5. Jones, D. P., Nevin, S. *J. Neurol. Neurosurg. Psychiat.* 1954, **17**, 148.
6. McMenemey, W. H., Nevin, S. *Excerpta med., Amst.* 1955, sect. VIII, **8**, 780; *Int. Congr. Neuropath.* 1955, p. 133.
7. Foley, J. M., Denny-Brown, D. *Excerpta med., Amst.* 1955, sect. VIII, **8**, 782.
8. Pallis, C. A., Spillane, J. D. *Quart. J. Med.* 1957, **26**, 349.
9. Jacob, H., Eiche, W., Orthner, H. *Dtsch. Z. Nervenheilk.* 1958, **178**, 330.
10. Nevin, S., McMenemey, W. H. *Proc. R. Soc. Med.* 1958, **51**, 535.

survive for a year. Conceivably some patients may recover from acute manifestations of the disease without gross loss of function. The clinical picture, although resembling that of subacute inclusion-body encephalitis, is dramatic and recognisable. Precise diagnosis depends on the demonstration of the characteristic lesions in the brain, either at biopsy or at postmortem examination. Electroencephalography is helpful in diagnosis; the abnormalities include partial or complete obliteration of normal rhythms, widespread high-voltage slow activity with generalised sharp-wave complexes and periodic interruption of the slow and sharp wave activity by runs of lower-voltage slow waves. The cerebrospinal fluid was normal in the cases examined.

The pathological changes in Nevin's 8 cases affected predominantly the cerebral cortex and were essentially the same in all. Nerve-cells were destroyed and lost without obvious pattern in all layers, and astrocytes and oligodendroglia were involved. The number of destroyed neurones varied according to the stage and severity of the disease. While there was necrosis of glial cells in areas of softened cortex, astroglial proliferation was pronounced in other parts of damaged cortex. Destruction of myelin fibres was scanty except in areas where cell destruction was gross. These changes were also found in the basal ganglia and cerebellum. No inflammatory infiltration was found, and searches for inclusion bodies were unrewarding. In 11 of the 23 reported cases cerebral softening due to vascular disease are said to have occurred concomitantly with the subacute encephalopathy. Status spongiosus was found in 3 of Nevin's 8 cases and in 15 of the 23 collected cases. Furthermore, Nevin et al. state that in the remainder of their patients loosening of the ground-substance of the brain was evident.

These workers seem to be on safe ground in distinguishing the condition from Creutzfeldt-Jakob disease. The overall clinical picture is dissimilar, and there are differences in the distribution and quality of the pathological lesions. The cause of subacute spongiform encephalopathy is obscure. The general absence of inflammatory changes, the negative virological studies, and the failure to find inclusion bodies suggest that an infective process is unlikely. Autoimmune reactions and degenerative or biochemical disorders seem also to be unlikely in view of the histopathological changes. Status spongiosus is found in cerebral grey matter in various conditions. It occurs in degenerative states where there is much cell loss (for example, Pick's disease and Alpers' disease); the space previously occupied by nerve-cells is empty, the glia failing to fill the gaps left by the disappearance of these cells. Status spongiosus also occurs in vascular disorders, such as cerebral arteriosclerosis and air embolism, and in hepatolenticular degeneration. Foley and Denny-Brown [7] suggested that an acute primary degeneration of the protoplasmic astroglia could lead to status spongiosus and ultimately to diffuse destruction of the cortex. But in Nevin's material nerve-cells were affected in areas where cavitation was slight or absent, and a proliferative astroglial reaction was sometimes seen. The view that vascular dysfunction underlies the disorder rests on the following evidence: in about half the published cases there was an episode of cerebral softening during the active stage; the extent of cortical softening, the distribution of the lesions, and the neuronal and glial changes suggest a vascular disorder; and in one patient who died after occlusion of the left internal carotid artery the characteristic microscopic changes were found in the right hemisphere, the left hemisphere being infarcted—presumably the cerebral circulation failed in the right hemisphere.

In only 3 of the 8 cases reported by Nevin et al. were spongiform changes found. They say that in the remainder " there was loosening of the ground substance ", which they apparently interpret as a milder manifestation of the same process. If they are right in this belief, then there can be no objection to the use of the name " spongiform encephalopathy ". Certainly the clinical picture and pathological changes, apart from status spongiosus, are much the same in all the cases they describe. We need to learn more about the pathophysiological mechanisms involved in the production of status spongiosus; in " spongiform encephalopathy " an exudative process may be involved. Electron microscopy of biopsy material should yield useful information, as it is already doing in investigations on the nature of the so-called ground-substance of the brain.[11]

ADOLESCENT, TEENAGER, OR HUMAN BEING?

" MEDICAL and social aspects of adolescence " was chosen as the first Subject of the Year to be discussed by the British Medical Association's divisions. During 1959–60 they met in small groups, and the report [12] now compiled from their deliberations may be said to represent the views of about 2250 doctors.

One group defined adolescence as " the time when the growing individual becomes aware of adult problems, and lasts until he or she has come to terms with adult realities ". It was generally agreed that its difficulties were increased by the attitude of many adults—some well intentioned, others less so. Through overemphasis " the awkward age " and the " difficult years " had assumed an artificial seriousness, and many of the doctors believed that the so-called " problems of adolescence " often arose from the normal rebelliousness of youth and that society had changed more than young people.

Changes in society's moral outlook are seen most clearly in sexual matters, and, compared with their grandparents, young people are reminded more often and more emphatically of the existence of sex. It is not surprising that among them there is greater freedom of sexual activity, which is further encouraged by the ease with which contraceptives can be bought and the largely unjustified belief that venereal disease is less to be feared than formerly. The recent alarming increase in the incidence of venereal diseases among adolescents shows that in fact many young people today are sexually promiscuous. (One general practitioner had been asked for his advice by the headmistress of a girls' school at which girls had approached their teachers to ask what were the most efficient kinds of contraceptive.)

Opinion was divided as to the best form of education about sex. Some thought that the parents were the most appropriate people to provide it. Others thought it should be given in schools. It was, however, emphasised that sex education should not be given as a formal isolated lecture, inviting morbid attention by its conspicuousness.

The doctors agreed that on the whole the health of adolescents was good and that they were probably seen less by general practitioners and consultants than any other age-group, and certainly less than twenty or thirty

11. Hager, H. *Arch. Psychiat. Nervenkr.* 1959, **198**, 574.
12. The Adolescent. 1961. Pp. 28. 2*s.* 6*d.* Obtainable from the Association, B.M.A. House, Tavistock Square, London, W.C.1.

years ago. They were, however, prone to certain physical disorders.

In one area otitis media was a common defect among school-leavers. Acne was widespread and more attention should be paid to it. The encouraging comment "You'll grow out of it" was no help to self-conscious boys and girls. Bad diet was a possible cause of many unpleasant skin conditions. The excessive consumption of carbohydrates and the appalling dental problems of adolescence were deplored. Many patients seemed to prefer wholesale extraction to having their teeth filled and regularly examined. Faults of posture and foot defects were also increasingly common, and unremitting efforts should be made to educate girls and parents in the choice of shoes that would not deform the feet.

Tuberculosis was no longer a big problem; but at least in some areas there was a tendency for girls to break down with sore throats, tonsillitis, and catarrhal infections when they first started work. One group also thought that throat and upper-respiratory infections were becoming increasingly severe and intractable. Smoking aggravated these conditions.

The general feeling seemed to be that the psychological problems of adolescence tended to be exaggerated. Only about 10% of delinquents, one report pointed out, could be said to need psychiatric treatment. More concern was expressed about exposure to materialism. Adolescents were wealthier than ever before and were recognised as "significant consumers". Their wants, fears, and tastes were studied with great care for commercial purposes. If only a small part of the ingenuity, inventiveness, and creativeness now directed to the sale of commercial goods to the teenage market were turned towards encouraging and popularising well-run youth organisations, much might be done to remedy the futility, boredom, and lethargic apathy in which so many people of today spent their leisure. Unfortunately, the pamphlet offers no precise suggestions as to how this might be achieved. It does, however, suggest that the B.M.A. might well undertake training courses for parents and that family doctors should play a much greater part in helping adolescents with their personal problems.

CARCINOMA OF THE LARYNX

THE division of laryngeal cancers into intrinsic and extrinsic forms has given rise to much confusion, and has now been largely abandoned. The extrinsic form is, in fact, a tumour of the pharynx, and except for proximity it has very little in common with true laryngeal cancer. Carcinoma of the larynx may present above or below the true vocal cords, but the commonest site is the cords themselves. The glottis is continuously exposed to all the inspired, carcinogen-laden air, which is then distributed over the much larger area of the bronchial tree. Yet, though the incidence of bronchial carcinoma has increased beyond doubt, there has been no parallel increase in the incidence of laryngeal cancer.

Clinically, the larynx is one of the less unpleasant sites for carcinoma. For this there are several reasons. The larynx is accessible and readily examined; and the smallest macroscopic lesion causes hoarseness. (This symptom is generally ascribed at first to laryngitis; and absence of response to treatment within two to three weeks constitutes a clear indication for laryngoscopy.) Furthermore, the subepithelial space tends to delay deep invasion of the cord, and the relatively poor lymphatic supply makes for late dissemination of the neoplasm.

A small, localised, squamous-cell carcinoma on the edge of the vocal cord is more amenable to cure than any other cancer, except basal-cell carcinoma of the skin [1]: in 70–95% of such cases the patient remains free of recurrence for at least five years after treatment by surgery or irradiation. This rate falls to around 40% for more extensive lesions. McCabe and Magielski [1] declare that attention should be centred less on devising an operation to encompass the large lesion than on establishing the diagnosis while the lesion is still small.

With the early, mobile, mid-cord carcinoma an excellent result may follow either surgery or radiotherapy; but the choice of treatment must be considered carefully in each case, with the available resources and skills in mind. Radiotherapeutic techniques have made great strides. The conventional high-voltage (250 kV) treatment, though effective, carried the penalties of severe skin and mucosal reactions and of general reactions. With the modern cobalt or cæsium bombs or supervoltage beams the side-effects are less severe, but treatment still has to be fairly lengthy and is associated with some discomfort. A normal voice nearly always returns with the disappearance of the tumour; and radiotherapy is generally preferable in the otherwise fit, younger patient, who often depends on his voice for a living. Surgical treatment consists in resecting the affected vocal cord together with a margin of healthy tissue all round the tumour. This operation of laryngofissure does not necessitate lengthy convalescence and is not usually accompanied by any general disturbance; and the voice is often surprisingly good. Surgery is indicated where the tumour is not regressing satisfactorily after radiotherapy; where the facilities for irradiation are inadequate; and sometimes in the elderly, who may be unsuitable for a complete course of radiotherapy and the associated discomfort. There is no place for an attenuated dose of irradiation, however small the lesion. Equally, local excision of the tumour is unlikely to eradicate the disease. In occasional cases it is permissible to observe the appearance of a doubtful lesion for a short time. McCabe and Magielski cite Furstenberg as claiming a 100% cure-rate from merely stripping the cord—repeatedly, if necessary—and close observation. Others [1] have had similar experience in this small group of cases.

In keratosis of the larynx, a precancerous state corresponding to leucoplakia which presents with white or grey nodules on one or both vocal cords, careful and frequent examinations are essential in order to detect any change. Radiotherapy has two disadvantages in keratosis: once applied, it cannot later be used effectively for frank carcinoma; and keratosis is relatively radioresistant even to full tumour doses. Some workers recommend stripping the cords; but the lesion tends to recur, and, if both vocal cords are involved, stripping may lead to glottic œdema. When carcinoma supervenes, laryngofissure offers the best prospects with unilateral disease. With more extensive disease, radiotherapy is usually applied in the first instance, and surgery for any residual disease.

The United Kingdom is fortunate in having efficient radiotherapy centres with highly skilled staffs throughout the country. Early carcinoma of the larynx is therefore generally irradiated, with excellent results. More advanced laryngeal cancers are also treated in the first place by radiotherapy; and total laryngectomy with or without radical dissection of the cervical lymph-glands is then undertaken for any residual disease. Preoperative radiotherapy makes subsequent recurrence less likely, especially in cases with subglottic extension of the lesion.

1. McCabe, B. F., Magielski, J. E. *Ann. Otol., &c., St. Louis*, 1960, **69**, 1013.

DOCTOR AND CLERGY

FIFTY years ago medicine rested confidently and comfortably on a bed of material science. Bacteriology and cellular pathology were in their prime, modern psychology in its infancy; physics had not invaded chemistry, atoms being solid particles of known weight; neurology divided " diseases of the nervous system " sharply into organic and functional, and had small concern for the second category; the word psychosomatic was not coined or the underlying conception recognised; suggestion, whether pathogenic or therapeutic, was almost outside the pale of orthodox medicine, by which indeed the mind (save as the seat of mental disease) was recognised rather grudgingly. The medical superintendent of a large asylum—not then a " mental hospital "—could tell an inquiring student that he believed the brain to secrete thought, as the liver bile.

Every kind of doctor spoke of " cases " without feeling either shallow or inhumane: " the ruptured kidney in number ten " did not seem either a comic or an offensive way of describing the patient in that bed. Doctors, as a class, were unquestionably more materialist than patients, as a class; and the doctor with a religious creed found it as easy as the agnostic to confine himself to the care of the body. A convenient fence divided this from the field of the priest, and the two did not overlap.

Since then we have found that nothing is what it seemed. The well at whose bottom lies truth turns out to have no bottom; the simple, confident, science-based materialism of the early 1900s is " out ", and most doctors are now, pretty certainly, less materialist than most patients. A doctor may find himself in the curious position of trying to persuade his patient to believe in the reality of his mind and in its power to produce symptoms and influence his body. We have, perhaps, an almost excessive regard for the machinations of " psyche " (continually searching for her under the bed), and psychology manifestly postulates the existence of mind, if not of spirit. In so far as the minister of religion may be held to minister to the spirit and attempt the healing of its wounds and diseases, it is clear that our fields do indeed overlap. But the fence, though scientifically and rationally unjustified, is still up in practice—partly perhaps because " good fences make good neighbours ". Parson and doctor nod to each other in the street or on the hospital staircase but never meet at the bedside and very rarely consult together for the patient's good. Patients in their houses, and sisters in hospital wards, take great care that medical and clerical visits shall not coincide, and there is general embarrassment when they do.

A booklet [1] published by the Australian Council of Churches contains five thoughtful and instructive papers read at a Clergy-Doctor Group Consultation held near Sydney last summer. The three clerical contributors are a former vice-principal of a theological college, a former senior chaplain for general hospitals in Victoria, and the chaplain of a mental hospital; the editor of the *Medical Journal of Australia* and a practising hospital physician of Sydney speak for medicine. Views apart, they describe what is being done in clerical colleges and medical schools " to educate clergymen in their role in the care of the sick " and doctors " in their role in relation to the spiritual needs of patients "; and what is being done, though perhaps less than is reported from the U.S.A., is considerable and increasing. Also described is the gradual acceptance of the chaplain to a mental hospital as a working member of the therapeutic team. Restraint, good sense, clear thinking and good will are as much in evidence as idealism, and the booklet is worth reading for its analysis of the problems as well as for its positive suggestions.

In this country, though hospital chaplains are more generally recognised as part of the hospital establishment, we seem more ready to be content with things as they are. But Dr. Hugh Jolly's address to chaplains which we publish this week shows that here, too, some attempt is being made to bring about a clearer recognition of the functions of doctor and minister in the service of the sick and to bring them nearer together.

1. The Doctor and the Minister. Sydney: Ambassador Press. Pp. 40

"PRESCRIBERS' JOURNAL"

To meet the need for " impartial information on new drugs and preparations in convenient and readily accessible form ", the Hinchliffe Committee thought that the *Prescribers' Notes* issued by the Ministry of Health should be replaced by an independent journal " run by the medical profession for the profession ".[1] The arrangements for the new *Prescribers' Journal* do not follow quite all the committee's recommendations, but we trust that the result may justify all their hopes. It is to be compiled by a professional committee of management supported by an advisory board of experts, and it will be issued six times a year to all general practitioners in the National Health Service, to the medical staff and chief pharmacists of hospitals, to clinical teachers in medical schools, and to students in their three final years.[2] The management committee has Prof. M. L. Rosenheim as its chairman, with two professors of pharmacology as his deputies; and its other members are four general practitioners, a pharmacist, and professional advisers from the Health Departments. The editor is Dr. J. L. Hunt.

The first issue contains much useful information presented clearly and in an independent way. Dr. C. D. Calnan writes on the value of griseofulvin; the topical application of corticosteroid preparations for skin disorders is discussed editorially; and in the first of a series of papers on antibacterial drugs Prof. L. P. Garrod discusses the use of the various penicillins now available. Besides publishing signed review articles on trends in treatment, the committee intends to provide expert advice on new drugs, to comment on the possible toxic effects of drugs both new and well established, and " to run certain regular features, such as summaries of clinical trials which are in progress or which have recently been completed, information about drugs dealt with by the Standing Joint Committee on the Classification of Proprietary Preparations (the Cohen Committee), and abstracts from topical articles about drugs which have been published in the medical press ". While there is great need for constant economy in prescribing, the journal, Professor Rosenheim says, will concentrate on *good* prescribing; for the committee thinks that " good prescribing must prove both effective and economic ".

Sir ROBERT PLATT has been re-elected president of the Royal College of Physicians of London.

Dr. R. A. LENNIE, a former regius professor of midwifery in the University of Glasgow, died on March 26 at the age of 71.

1. Ministry of Health: Final Report of the Committee on Cost of Prescribing. 1959. See also *Lancet*, Feb. 18, 1961, p. 379.
2. Supplies permitting, copies will also be obtainable on application to the Editor, *Prescribers' Journal*, Chesham House, 136, Regent Street, London, W.1, at 6d. a copy, post free.

Needs and Beds

PRESCRIBING COMMUNITY CARE FOR THE MENTALLY ILL

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THE concept of community care sprang from the change in social attitudes towards mental illness, and was nourished by the desire to reduce the pressure on mental-hospital beds and the hope of saving money by keeping patients out of hospital. It was thus originally conceived in the interests of the community, and the interests of the patient were not emphasised till later. A retrospective change in therapy arose out of an opportunist solution of the problem of the overcrowding of mental hospitals, and the difficulty of staffing them. Other advantages were of course postulated, such as more efficient coordination between the hospital and the local health authority, and the breakdown of public ignorance of mental illness. But as far as the patient was concerned, the benefits of treatment at home or as an outpatient were at first urged without any very clear idea of therapeutic indications. This defect has now been remedied to some extent; but a more critical evaluation of the grounds for prescribing this form of management, and a clearer appreciation of the difficulties of application, are necessary for its useful expansion in the interest of the patient.

The object of community care is to give the patient the support of community life and to avoid segregating him artificially in a hospital, isolated from normal social contacts. This could imply, of course, that it is always preferable, wherever possible, to keep the patient out of hospital; and it also hints at the stigma which attaches to the mental hospital in the minds not only of patients but also of doctors. This emotionally charged attitude will hardly help towards an objective decision on the best methods of treatment for the patient. A determination to keep him out of hospital at all costs cannot be accepted as a positive indication for community care. It does show, however, the need to provide within the hospital the means to readapt him to life under sheltered conditions as a preferable alternative to struggling for recovery against the adverse pressures of a competitive community.

THE DOCTOR'S CHOICE

The success of such pioneer schemes as those at Worthing, Nottingham, Bolton, and Oldham is in no small measure due to advances in active psychiatric treatment during the last twenty years. Without the control and alleviation of symptoms achieved by psychiatric treatment, the patient's relatives and the community might well reject him, or at least find great difficulty in cooperating in his social readjustment. Often the application of recent methods of treatment underlies the change in therapeutic policy, and has made possible a more liberal approach to the management of some patients.

In the adult psychiatric department of a teaching hospital where I have worked there are 450–500 new referrals to the outpatient clinics each year, of which 80–90% are made by general practitioners. I became curious as to the reasons why practitioners sent their patients to this teaching hospital, rather than to the psychiatric clinic in the local general hospital staffed by the area mental hospital. Doctors who would use the teaching hospital because of proximity were excluded and a questionnaire was sent to a random selection of 30 others. To each of these, psychiatric clinics in local general hospitals were, in fact, available.

The results of the inquiry were illuminating. In the first place, the extent of cooperation and the amount of detail supplied were directly proportional to the interest which the doctor admitted to having in psychiatry, but the reasons given for referral to the teaching hospital usually showed the personal bias of the doctor away from the mental hospital. They also reflected the attitude of patients, and suggested that general practitioners are strongly identified with their patients in this respect. Points emphasised in favour of the teaching hospital were: avoidance of the stigma of the mental hospital should the patient require admission for diagnosis or treatment; the courtesy and attention of the nurses at the teaching hospital; the fact that more personal and consistent attention from a single doctor was possible than in a crowded local clinic; and a belief that more expert and thorough assessment would allow the patient to be treated as an outpatient rather than as an inpatient. Pressure from the patient or relatives was also a reason, and the higher social status of patients influenced some doctors in choosing the teaching hospitals.

The inquiry illustrates the importance of the doctor's personal feelings on mental illness and its treatment. If he has *no* choice but the local psychiatric clinic, with its association with the mental hospital, he may go to considerable lengths, though perhaps unconsciously, to keep patients away from the psychiatrist. Certainly it is only too common to see a patient referred, after months or years of treatment for somatic symptoms, when the practitioner can no longer deal with the underlying psychiatric disturbance. I do not believe that the experienced practitioner tends to make his psychiatric diagnoses entirely by exclusion, but I am more and more of the opinion that his personal prejudice against formal psychiatric management plays a large part in the delay in referral. The initial screening of patients for inpatient or community care, and even the nature and extent of that community care, may in fact be determined by the practitioner in his surgery rather than by the psychiatrist at the outpatient clinic.

My small inquiry suggests that when a doctor sends his patient to a teaching hospital with few inpatient facilities, he has already elected community care as the treatment of choice. When he cannot send the patient to such a hospital, he may well elect to treat some patients himself, especially if his antipathy to psychiatry is strong. I suggest that, as psychiatrists, we are being naive if we assume too readily that the community-care services are as welcome or as satisfactory as we would like to think. Nor must we forget that the average practitioner, because of his training at a teaching hospital and his house-appointments, has become accustomed to a hierarchical system which included only doctors and nurses, and he does not readily accept the judgment and help of ancillary staff.

This difference in outlook is important when we consider the staff who run a community service. As there are not enough psychiatrists to go round, ancillary staff must play a large part in the social reablement of patients. Sometimes non-medical people who are working within the community are most suitable for this, because some patients are reluctant to seek medical help. Thus Heimler,

a psychiatric social worker, found a large untapped reservoir of psychiatric illness among recipients of National Assistance who were unable to hold down a job.[1] At Warlingham Park Hospital nurses trained as outpatient nurses have proved of the utmost value in supplementing the P.S.W.S, especially in following up discharged cases, where previous knowledge of the patient enabled the nurse to give him confident support and to bring back an accurate picture of his current mental state. These examples suggest that efficient and practical community care depends not so much on how, or from where, the service is organised as by whom it is carried out.

AN EFFECTIVE PRESCRIPTION

This survey suggests that we should look at community care more critically and prescribe it as a form of therapy in its own right. If we do this, we shall be in a better position to know when to use it effectively and to avoid the temptations of over-prescribing.

The *positive indications* for community care rest on a firm diagnosis of mild to moderate illness which can be adequately treated outside hospital with the facilities locally available. It should be possible to modify domestic, financial, or other environmental stress without removing the patient. The cooperation of the patient and his relatives must be ensured, and the patient should not be denied intimate and sympathetic social contacts while he is at home.

Community therapy offers:

1. *General measures.*—These include reassurance and encouragement from general practitioner, from social worker, health visitor or outpatient nurse, and from the psychiatrist; together with tolerance and understanding from relatives.

2. *Palliative measures* by means of drugs or psychotherapy which by early alleviation of symptoms will encourage both the patient and his relatives.

3. *Specific measures*, with electrotherapy, phenothiazine drugs, and so on, must be undertaken where possible to abolish symptoms and permit stable readjustment within the community. Treatment is usually lengthy, as in chronic physical disease, and patient and relatives must often be prepared to accept a slow recovery.

Like other forms of treatment, community care has complications and side-effects. The patient and his relatives become impatient at slow progress. Relatives tend to place all responsibility for the patient, once he is under treatment, on the shoulders of the general practitioner or psychiatrist. Initial improvement, which may be likened to a placebo effect, may be followed by relapse, and inpatient treatment may then become imperative. The patient may increase his demands on relatives to a point where they cannot meet them, with a consequent deterioration in emotional relationships.

The prescription of community care therefore places considerable burdens on the patient, the relatives, and medical and ancillary staff. Any significant deterioration in the patient's condition calls for a reappraisal of therapy, and decisions about changing the prescription must be taken by the psychiatrist. It is important to note how many different ingredients make up the total prescription, and each of these must be given its proper weight. All too often the contributions of relatives and of general practitioners are deficient.

Since mental illness has many causes, its management is difficult and its correct appraisal obscure. Because of the imprecision of our knowledge, there is a real danger that we shall be subjected to external pressures in our dealings with it. Public interest has been awakened in community care, and plans bid fair to outstrip the achievement of what is both practical and proper. I do not wish to decry its advantages, but I would urge that we should strive for a more critical assessment of its aims, its indications, and its practical application.

1. Heimler, E. *Med. Offr*, 1955, **94**, 351.

Points of View

COOPERATION BETWEEN DOCTOR AND HOSPITAL CHAPLAIN *

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THE hospital chaplain has a job to do, and the doctor should assist him. We are both working for the same aim —the benefit of our patient—and therefore must work in harmony. The doctor's cooperation should not depend on his own religion but only on that of his patient: even if he has no religious feelings he must give the chaplain whatever help the patient needs and demands. This is perhaps obvious; but on several occasions when I have asked doctors and nurses for their views I received the reply that they were not religious and therefore could not help me. Obviously, a doctor with a firm faith is likely to give more help than one who is without; but, whether he has faith or not, courtesy demands that he should assist the priest in his work for the patient whom both serve. In other words, the doctor must accept that the chaplain has a function.

* * *

In hospital there are many difficulties, and it is all too easy for the chaplain to appear to be on one side with the medical and nursing staff on the other. This situation is made worse if the chaplain, on entering the hospital, feels out of place. (That he has this feeling is largely the result of the doctor's possessive attitude towards the patient, whom we wrongly regard as " ours ". The same criticism of hospital staff is also sometimes made by general practitioners.) Equally, it is not helped if the parson is aggressive or perhaps too hearty.

Another way in which the relationship breaks down is when the doctor, in coming to do his ward round, turns the chaplain out of the ward. This matter must be sorted out personally between chaplain and consultant, and for my own part I am delighted to see the chaplain; but I realise that the problem is less difficult in children's wards, especially where (as in ours) visiting is allowed at any time. It is understandable that some doctors prefer the chaplain not to be in the ward when they do their round, and, if that is so, the only obvious way out of the difficulty is for the chaplain to avoid the times of ward rounds. If the doctor has no fixed time for his round, he and the chaplain should together find some solution.

I understand that in some hospitals combined rounds take place between the consultant and the chaplain, but for my part I would not wish to have the chaplain on the ward round. For one reason, my rounds start at 9.0 A.M. and sometimes do not finish until nearly 2.0; and I should

* Abridged from an address to South Regional Western Hospital Board conference for chaplains, April 28, 1960.

hate to think of a chaplain wasting his valuable time by following me through the ward. I should suppose, too, that from a medical point of view there might be difficulties and the patient might be embarrassed, if the chaplain were present. I do not know how these problems are tackled in hospitals where combined rounds take place, but though I would like the chaplain to feel that he can ask for clinical details I would prefer to limit discussion to selected cases. I know that you do not want the intimate clinical details that make up our day-to-day work; but I realise that you must have some idea of the severity of the illness, the likely prognosis, the expected length of stay in hospital, and whether there is a risk of death.

Some consultants will think it quite wrong that any such information should be divulged to you, but this results from a lack of trust between consultant and chaplain. The chaplain should be able to get this information because he is a member of the hospital staff and in the same position of privilege with regard to confidential information as the doctor. But when the chaplain does require detailed clinical information, may I suggest that he ask the consultant and not the house-physician or the sister? Most consultants, realising that there must be a serious reason why you want the information, would prefer to handle this confidential discussion themselves, and they might even resent an approach to the houseman.

* * *

How much medical knowledge is required by a hospital chaplain? In some American theological colleges, I understand, the chaplain is given a great deal of clinical instruction. But the average man cannot be a first-rate chaplain and a first-rate doctor; and it is not clinical interest which is required by the chaplain. I think the chaplain should have a good general knowledge of medicine, comparable to that of any intelligent layman, but more training should be given in the ordinary handling of the sick, particularly as regards their emotions. An absence of such knowledge was the reason for the comment by one sister (who is most anxious to cooperate) that she wished chaplains could have an intensive course in the general problems of the sick before they were let loose in the ward. You should also know the functions of the different members of the medical, nursing, and administrative staff. A new student nurse may be delighted if you call her " Sister ", but the sister herself is unlikely to view your mistake in the same light. It is equally important that we should have a similar knowledge of your hierarchy in order to avoid mistakes. I would suggest also that you should have a working knowledge of medical jargon—though I was appalled the other day to see that a rubber stamp had been used in a child's notes so that the different childish ailments including baptism(!) could be ticked off.

* * *

The chaplain may want information from the hospital staff about the patient's social circumstances. This would be unnecessary if the patient's visiting chaplain were his own vicar, and this, when possible, is the ideal arrangement. The vicar could give us a great deal of valuable information about the patient's background; and there are other ways in which he could give more help than an unknown hospital chaplain. For example, many women in the wards are anxious as to what is happening to their family while they are away. If the vicar could visit the mother with the information that all was well at home, that father was getting his supper, and the children were happy, I believe she would be helped immensely and this sort of assistance might be a strong factor in bringing the family to church. But I realise that, for administrative purposes and because of distance, there must be one chaplain in charge.

Nevertheless there should always be a separate chaplain for each denomination rather than one interdenominational chaplain. Illness is not a good time for learning religious tolerance, and patients can be upset if they are attended by a chaplain who is not of their own denomination.

When a patient is discharged from hospital, the chaplain should be able to pass on information to the patient's own vicar, in just the same way as the consultant hands over to the patient's family doctor.

In the children's wards we have sometimes felt that there was insufficient follow-up of the children who have been baptised in hospital. It has appeared to us that the second part of the baptismal service in church, which is obviously the parents' responsibility, does not always take place. We have also sometimes felt that parents have not been given enough information about the meaning of baptism before the actual service, though obviously in times of acute emergency there may be little opportunity for such instruction.

* * *

I would recommend that your visits should be short. The sick patient is very easily tired by visitors. Doctors when visiting their sick colleagues are often the worst offenders.

Before you go into the ward you should, of course, always speak to the sister and inquire how the patient is and for how long he can be visited. The sister will appear obstructive only if obstruction is in the patient's interest or if she thinks it is. If she says that the patient is too ill to be visited I would think that your liaison with her was not good enough, because a minute's visit from you would not be harmful; but perhaps the sister does not realise that you would be prepared to go in for so short a time.

One way in which sisters and doctors are upset is by the sort of ill-informed leaflet that we have seen handed to parents. Some years ago a very enthusiastic young chaplain asked the sister to give parents a leaflet in which was written: " If your child is ill put him entirely in God's hands; if he is very ill call the doctor." We felt it preferable that both should be called in at the earliest stage!

More instruction on the work of the hospital chaplain is required by nurses. At least one lecture should be given to student nurses in training, and a lecture from the chaplain to the sisters and the staff nurses might also be welcome. These lectures would have to be advertised as being on the work of the hospital chaplain and the means of cooperation and coordination between the chaplain's department and the other services. I mention this because doctors and nurses become scared of anything which suggests a prayer meeting. To arrange such lectures, a direct approach to the matron from the chaplains would be required and it is unlikely to be turned down.

Sisters should be able to give patients a booklet with the names of the chaplains and any other visiting clergy, the times of services, the facilities available, and a suggestion that the patient should let the sister know if he wishes his vicar to call. I have heard it suggested that the chaplain should routinely be informed of any patient about to undergo an operation, but I do not think that the medical staff would agree to this. If everyone who was going to have an anæsthetic was visited by a chaplain the previous day, some would be frightened and might even feel that they were being given the last rites. I have also

heard it suggested that an indication of the patient's religious denomination should be shown on his bed. I am told this happens in some hospitals, but I would be against it and I do not believe our medical staff would agree to it. The plan that you should have different coloured labels for each faith, and presumably a black or a scarlet one for the agnostic, does not appeal to me. Many sisters feel that the hospital ward should not be used as a mission field, and that such evangelising should have been done before, or be left till after the patient goes home. They feel that you should not attack the patients when they cannot retaliate. Not long ago, in her column in the *News Chronicle*, Sarah Jenkins wrote: " I can never successfully small-talk hospital chaplains, and I fear I make it too obvious that if my soul is going to be saved I don't want it to happen because I am one degree under."

Another aspect of your work which I have discussed with the medical and nursing staff is the question of hymn-singing and services in the ward.

To a large extent the staff are not in favour, on the ground that some patients dislike having to take part in such religious activity although they do not like to tell the chaplain. It seems that in a small cottage hospital, where the vicar is well known, the services are welcomed, whereas in a big ward a proportion will enjoy it but perhaps the majority will not. I am aware that there is a considerable difference in the views of the patients as given to us on the one hand and to the chaplain on the other. Possibly if a questionnaire were handed to patients, doctors, and nurses at a number of hospitals, a truer picture of current opinion would be obtained.

These remarks do not apply to the children's wards, where all are agreed on the value of Sunday school and services and on the pleasure they give. I also have no doubt of the value of services in the hospital chapel, and of the relaying of these services through an internal system to the patients' earphones.

* * *

What is the priest's responsibility to the doctor with regard to the patient? You will undoubtedly feel that there is no need for a preliminary discussion between the doctor and chaplain before the chaplain visits; but, even if you aim to talk about religious matters only, you will inevitably be drawn into talk about his illness, and before you realise it you may find yourself in deep water. I can best explain this by an illustration:

An orthopædic surgeon had a patient with a severe illness. The priest suggested to the patient that he should go to Lourdes, and the mechanical problems involved in his journey cut right across the surgeon's treatment. There are two sides to this question. Obviously the doctor has no right to question the chaplain's right to pray with his patient, and Lourdes might be regarded as an extension of this same right; but in this particular instance, where the work of the orthopædic surgeon was undone by getting the patient moved, it would have been better if the priest had discussed the journey with the surgeon before recommending it to the patient.

* * *

This leads me to the Church's ministry of healing. As a doctor with a scientific training, one is bound to wonder how much of the success of this ministry is due to suggestion. To some extent all doctors practise faith healing even though they do not call it by that name—you cannot be a good doctor if your patients have no faith in you. Suggestion is of course a recognised form of therapy, but its use precludes giving the patient insight into the mechanism of his symptoms, and it may well be the wrong line of treatment. I appreciate that a priest will probably not agree that his success is due to suggestion, but it does make one ask how much a priest should know of psychology.

My own feeling is you should know as much about psychology as does a good general practitioner. This knowledge is not required so that you should practise psychology, since obviously that would be quite wrong, but so that you will avoid the pitfalls which may be invisible without such knowledge. Disturbances of behaviour such as stealing, prostitution, and other forms of immorality may well be symptoms of a deeper disorder whose cause must be found before preventive or therapeutic treatment is started.

* * *

We are very much on mutual ground in the question whether a patient should be told he is dying. I can well understand your view that you can do little to help the patient if he is not permitted to know the facts, or if the patient's pretence that he does not know he is dying is to be kept up. I believe that more patients should be told that they are dying. Admittedly, since my practice is limited to children and I consider it would be wrong to tell them, I give this opinion without much practical experience, but it is in line with the report of the Archbishop's Commission on the Church's Ministry of Healing, on which both doctors and clergy sat. This says: " It may be the duty of the priest to tell the patient of his approaching death but in exceptional circumstances he may have to accept the doctor's direction that the patient must not be told."

Whereas the Commission evidently regard it as exceptional that the patient should *not* be told, my impression is that the majority of doctors regard it as exceptional that the patient *should* be told. This is something which requires close discussion between priest and doctor in order to work out what is best for the individual; and in such discussion I think you could persuade many more doctors that the patient should be told.

Medicine and the Law

Reasonable Care and Unreasonable Fatigue

ON April 12, 1957, the plaintiff, a steel erector, aged 57, was hit on the head by a podger spanner, weighing 4–5 lb., which was accidentally dropped from about 50 ft. above by a fellow workmen.

He sustained a gash about 1 in. long on the right frontal area of his skull. He was taken to the casualty department of the Luton and Dunstable Hospital where the wound was cleaned, three or four stitches were put in, and he was sent home. He subsequently suffered from headaches and dizziness and in January, 1958, a depressed fracture of the skull was diagnosed and X-rays showed a hole $^1/_4$–$^1/_2$ in. diameter in the skull and a piece of bone which had been forced through into the brain itself. On March 11, 1958, a large mass of scar tissue was removed together with a portion of the vault of the skull. Soon after the operation the plaintiff had an epileptiform attack, developed meningitis, and spent a month in hospital: when he left he had a dropped foot. He had a further operation for the insertion of a plate in his skull. He was unable to follow his former employment.

He sued his employers and the Luton and Hitchin hospital management committee for damages for personal injuries, alleging negligence. The employers admitted liability for the accident but not for the consequences,

which they alleged were due to the hospital's failure to X-ray the plaintiff or to perform an immediate operation. The hospital denied negligence.

Mr. Justice PAULL, having assessed the damages at £5250, said that the most difficult question was: ought any part of the damages to be borne by the hospital, and if so how much? The hospital had admitted that they had failed to discover the fracture and penetration of bone into the brain tissue and that if it had been discovered there would have been an immediate operation. The casualty officer had described the normal procedure he would have followed in a case of this kind; but, assuming that he had followed that procedure by examining the plaintiff first orally to find out what he could about the accident and then physically with his gloved finger, his Lordship was bound to find that the failure to have the plaintiff X-rayed and to find the hole by physical examination lay outside the limits of proper care. He was satisfied, however, that the doctor was a competent and very careful doctor. It would be the greatest possible injustice to him if any other view was taken of him as a result of this case. There was no man who could honestly say he had not fallen below the standard of reasonable care at some time in his life.

The burden of work put upon the casualty officer at the hospital was such that it was not surprising that a young doctor should fail on occasion to measure up to the standard of reasonable care. There was only one casualty officer, who was on duty on each of his working days continuously from 8·45 A.M. to 6 P.M. without allowing for having to stay late on an urgent case. In addition, he was on night duty one night in three, so that on the third day he had an uninterrupted stretch of 33 hours, getting such sleep as he could between casualty cases during the night. Casualty officers were usually young men and it was important both for their sakes and for the sake of the patients that they were not overburdened with work. Evidence had been given that if a casualty officer sent too many cases for X-ray there would be complaints from that department, and though he could call for assistance from other doctors a report on any casualty officer that he was unwilling to take responsibility or could not cope with the work could be damning if another post was sought.

There were, however, two criticisms to make of the doctor here: (1) he had had no X-ray taken; and (2) he had not discovered the hole by physical examination. It followed that the hospital management committee must be responsible for any consequences of the accident which flowed from the failure to discover the fact that a piece of bone had been driven into the plaintiff's brain. They would have to bear part of the damages due to delay in operation and for the extra pain and suffering, the damages for the meningitis, for the dropped foot, and half the damages for the risk of epilepsy. There would be judgment for the plaintiff for £4675 against his employers and for £575 against the hospital management committee.

McCormack *v.* Redpath Brown and Co. and Another—*Queen's Bench Division:* Paull, *J.* March 23, 1961. Counsel and solicitors: John Thompson, Q.C., and John Platts-Mills (W. H. Thompson); R. Marven Everett, Q.C., and H. Tudor Evans (E. P. Rugg & Co.); James Stirling, Q.C., and B. J. Wakley (J. Tickle & Co.)

E. M. WELLWOOD
Barrister-at-Law.

Medical Examination Refused

An employee claimed damages alleging that he had contracted dermatitis in the course of his employment at a factory through the negligence or breach of statutory duty on the part of his employers. When the action came before the Master on a summons for directions an order was made that in default of agreed reports medical evidence should be limited to two witnesses on each side. The employee subsequently submitted to examination by two doctors acting on behalf of the employer. Before the trial of the action one of those doctors died, and the employer thereupon required him to be examined by a distinguished dermatologist; the employee refused to be examined by this particular doctor. The employer then applied to the Master for an order to stay the action until after the employee had submitted himself to examination by the dermatologist and to patch tests. The Master refused to make such an order, and on appeal to the Judge in chambers this decision was upheld. The employer now appealed to the Court of Appeal.

Lord Justice WILLMER, dismissing the appeal, said that he had no doubt that the court had an inherent jurisdiction to make such an order, but it was a long step from that to saying that it ought to be exercised in this case. It was a power that would be sparingly used to prevent an abuse of the processes of the court.

The question whether power should be given to order a medical examination had been considered by the Committee on Supreme Court Practice and Procedure, and in the Evershed report it had been decided that no such power was necessary. The employer would have had no right to obtain a direct order from the court compelling the employee to submit to examination, and the present application amounted to an attempt to obtain by indirect means that which could not be obtained by a direct order. The court had been told of two cases in which a Master had ordered a stay where the plaintiffs had refused to undergo any examination at all by the defendants' doctors; it was not necessary for his Lordship to express an opinion, but he would like to reserve his view on the propriety of making such orders.

It did not matter whether the employee's objection was well founded or not; it was his own case, and he was entitled to present it in his own way. If his objection was ill founded that would no doubt have an effect on the mind of the trial judge. But to compel a plaintiff by an indirect method to submit to an examination was an improper and unnecessary interference with his right to present his case in his own way.

Lord Justice DONOVAN, concurring, said that in his view it would be wrong to shut out a plaintiff from the seat of justice even if he refused to undergo any examination at all; still less should he be shut out where, as in this case, he refused to be examined only by one particular doctor.

Pickett *v.* Bristol Aeroplane Co. Ltd.—*Court of Appeal:* Willmer and Donovan, *L.JJ.*, March 16, 1961. Counsel and solicitors: Marvin Everett, Q.C., and Granville Wingate (Cartwright, Taylor & Corpe); Gerald Gardiner, Q.C., and David Turner-Samuels (W. H. Thompson).

M. R. BARRINGTON
Barrister-at-law.

Public Health

Food Labelling

The Food Standards Committee is to review the labelling provisions of the Labelling of Food Order and of other food regulations. It will not at present be concerned with provisions relating to advertisement. Written evidence from interested organisations should be sent to the Joint Secretary of the committee, Great Westminster House, Horseferry Road, London, S.W.1, by May 4.

Special Articles

TRAINING FOR CHILDBIRTH

MODERN methods of training for childbirth are a hopeful advance, said Prof. W. C. W. NIXON at a meeting organised by the Natural Childbirth Trust in London on March 21. Instead of a National Health Service we have a national disease service. It costs us seven hundred million pounds a year and its main emphasis is on mechanistic methods and attitudes. This is deplorable and we must initiate a new order. Already there are hopeful changes and improvements and a shift in emphasis from the mechanistic and pathological to the prophylactic and preventive.

The chief speaker was Dr. PIERRE VELLAY, of Paris, whose method of psychoprophylactic preparation for childbirth is now well known throughout the world. Dr. Vellay has continued the work of Lamaze, who in turn derived this from Russian methods. Dr. Vellay pointed out that when the method was first introduced successes were rare. But now 35% of all deliveries by the method are completely painless; in 63% there is tolerable pain; in 4–5% there is total failure.

Dr. Vellay said that, despite the modern emphasis on psychoprophylaxis, childbirth remains an obstetrician's job. The development of psychoprophylactic methods has broadened the obstetrician's view and has brought experts in other fields into the subject of childbirth. These include physiotherapists, psychotherapists, psychologists, and sociologists, all of whom have valuable contributions to make; but such specialists tend to distort the subject by looking at it from the point of view of their particular interest and cannot really view it as a whole because they have no obstetrical experience. They can help the doctors and midwives, but not displace them.

In Dr. Vellay's view, painless childbirth is achieved by a combination of the correct conditioned reflexes, adequate training exercises, and successful human relations. Ultimately success depends on a balance between the brain and the uterus.

He outlined the training that is given to expectant mothers in his clinic in Paris. It is, he said, essential to take a full psychiatric history, with special emphasis on the woman's attitude to childbirth, her relationship with her own mother, and her mother's attitude to pregnancy and childbearing. A full record of trauma and conversations about childbirth throughout the pregnancy are very important, as is a full account of the patient's sleep. Any insomnia must be carefully investigated and full inquiries made about dreams. In cases of disturbance Dr. Vellay uses the services of a " psychosomatician ", who plays an important part in antenatal care. In about 80% of Dr. Vellay's cases, pregnancy starts normally and continues normally; the care of the obstetrician and midwife suffices in these cases. In about 15% pregnancy is complicated by special difficulties and attitudes to pregnancy and childbirth. A further 5% of cases he considered to be " pathological ".

In Dr. Vellay's view, there are several reasons why methods devoted to painless childbirth have often failed in the past. For one thing, the process of painless childbirth has sometimes been regarded as though it were some sort of chemical reaction, always occurring in the same way. In fact, each mother is different and the method must be adapted to her needs. Another source of error has been too much emphasis on the accuracy of lectures and instruction, and too little on the personality of the instructor. The personality of the instructor can be ignored only if he is part of a homogeneous team. The building up of such a team, though difficult, is essential in institutional midwifery; otherwise the strain on the obstetrician is too great. At its best, psychoprophylactic preparation for childbirth is a " spectacular crystallisation " of the mother-child relationship, which has an effect throughout the child's life and should help to bring mental health to the next generation.

Ideally, preparation for childbirth starts in childhood, said Dr. Vellay. Parents and pædiatricians have a responsibility here. During the pregnancy itself the obstetrician should give at least two lectures to the mothers, and the lecture timetable should be taken seriously and observed strictly. Husbands should also receive some instruction, and their presence in the delivery room is beneficial. During the delivery itself the mother has strong emotional feelings towards the obstetrician. The minute the baby is born she transfers a host of emotions to her husband.

Dr. Vellay's antenatal course for mothers consists in four lectures from obstetricians and four from midwives. In addition the mothers visit the labour ward and talk to recently delivered mothers. They are also shown a film of painless childbirth.

In reply to a question, Dr. Vellay said that 40% of all women in France are now delivered by this method. It is widely accepted and the fees charged for the course are refunded by the *Securité Sociale*.

Dr. Vellay's lecture was followed by a display of slides which he shows to mothers. These were first-class examples of visual teaching-aids. He then showed on film a number of deliveries accomplished without either pain or medication, and these included a breech delivery and forceps deliveries. Dr. Vellay said that, if the mother is adequately prepared and has the right attitude, most forceps deliveries can be done without either pain or anæsthesia. He, himself, does four out of five forceps deliveries without anæsthesia.

The chief value of this method of training for childbirth, said Dr. Vellay, could be regarded as the reduction of complications, especially postpartum hæmorrhage. In his view many postpartum hæmorrhages are due to general anæsthesia. In his series of 1710 deliveries there were only 6 women who required anæsthesia and 1 who required a blood-transfusion. Only 2 patients had to stay in the clinic for longer than eight days. In 75% of primigravidæ the perineum was intact at the end of labour; the remaining 25% had either episiotomies or lacerations.

Later Dr. Vellay took part in a brains trust with Professor Nixon in the chair. Other speakers included Dr. Lee Buxton, professor of obstetrics at Yale University, Miss Margaret Williams of the Natural Childbirth Trust, who is also a physiotherapist, and Miss M. M. Nugent, a midwife.

It was asked why so few English and American obstetricians were interested in these methods. Professor NIXON believed that obstetricians often seem to be hostile because introducing any reform is uphill work. Only slowly are mechanistic methods and attitudes changing in this country. Miss NUGENT suggested that midwives should take a refresher course in preparation for childbirth, for which they would receive an additional certificate. A precedent would be the refresher courses, with certificates, that were organised to instruct midwives in the use of analgesic apparatus. She emphasised that these methods can be practised even in an overworked maternity department, and if the staff are willing to cooperate they are saved work in the long run. Mothers who are properly prepared for childbirth spend less time in the labour ward and make less work for midwives.

Dr. LEE BUXTON, a pioneer in the field of psychological care during pregnancy, has just spent a sabbatical year studying emotional aspects of pregnancy in thirty-three obstetrical units in Europe and the United States. He has found that there are more than twenty different methods of psychological preparation for childbirth. These fall into four or five different categories. Many obstetricians, he said, are not convinced of the *obstetrical* value of these methods, which could be regarded as repudiating the obstetrical advances of the past hundred years. Moreover, those who believe in natural childbirth tend to be unscientific. Grantly Dick Read, for example, said that Nature never intended childbirth to be painful,[1] but there is really no evidence for this statement. There may also be hysterical elements in these methods. Women may *say* that they feel no pain because of pride, because they do not wish to disappoint those who have been trying to help them, because they are afraid of the sense of failure, or because they refuse to admit suffering. In fact, those who practise these methods may

1. Read, G. D. Revelation of Childbirth. London, 1942.

be depriving women of humane pharmacological means of relieving severe pain.

* * *

Dr. Lee Buxton had previously elaborated this theme in a lecture at University College Hospital on March 16. All the different methods of painless childbirth achieve about the same proportion of success—about 80% of the mothers suffer no pain or tolerable pain. Are all these techniques harmless, he asked. Pain, after all, has physiological value, and what about the mothers who train for painless childbirth and then fail to achieve it owing to personality factors, inadequate training, or complications during the labour? Might this lead to a sense of guilt, failure, frustration, and inadequacy? Even if this happens in only a small proportion, the dangers of anæsthesia and analgesia must not be emphasised, as has sometimes been done in the past, as this can have a bad effect on these patients.

The frequent complaint of women that amnesia at the moment of delivery robs them of the experience of childbirth has been a powerful force in the development of these techniques. But in depriving the woman of pain we may, in fact, be depriving her of something much more important. Many women refuse to attend classes for preparation for childbirth—is this because they need the pain? And what of the women who regard the moment of delivery rather like sexual orgasm—what sort of emotional state does this indicate?

Dr. Lee Buxton pointed out that the psychological influences on women in childbirth may be much simpler than we think. Some of the present methods derive from "natural childbirth", which has resulted from the work of Grantly Dick Read and Helen Heardman. Some critics say that these are little more than hypnosuggestive methods reminiscent of the autosuggestion of Coué.

Other methods are deliberately based on hypnosis. One drawback of these is that women may object to not being aware of what goes on while they are being hypnotised. Moreover they may develop a serious complication, heralded by pain, without being aware of it. The psychoprophylactic methods practised by Dr. Vellay stem originally from Pavlov and are based on the idea that conditioned reflexes can block the pain sensation. Many obstetricians believe in the value of relaxation exercises. Heardman has emphasised the importance of muscular preparation for a muscular event. Some of the training that Dr. Lee Buxton saw mothers undergoing in Scandinavia seemed to be more suitable for the Olympic Games than for childbirth.

Dr. Lee Buxton suggested that we should search for common denominators in these methods. It may be the personality and enthusiasm of the person conducting the labour; it may be the kindness, comfort, humanity, and care given by someone trained to give it; it may be the feeling of confidence and security throughout.

GENERAL MEDICAL COUNCIL

UNDER the Medical Act, 1956, the present term of office of the eleven elected members of the General Medical Council will end on April 29. Notices of elections to fill the vacancies were published on or about Feb. 11. The last date for the receipt of nomination papers was March 1, and the number of candidates nominated for election in each of the three constituencies (England and Wales, Scotland, and Ireland) did not exceed the number of persons to be elected. The following have accordingly been elected members of the Council for five years from April 30:

England and Wales.—Geoffrey Osborn Barber, O.B.E., M.B.; Lawrence Dougal Callander, M.D.; Wilfred Vivian Howells, O.B.E., M.B. (resident in Wales); Alfred Talbot Rogers, M.R.C.S.; Steuart Noy Scott, M.R.C.S.; Solomon Wand, M.B.; Weldon Patrick Tyrone Watts, M.S.; and Katharine Georgina Lloyd Williams, C.B.E., M.D.

Scotland.—Ian Dingwall Grant, C.B.E., M.D.; and George Walker Ireland, O.B.E., M.B.

Ireland.—William Doolin, F.R.C.S.I.

FINANCIAL ESTIMATES

THE estimated gross cost of the National Health Service in England, Wales, and Scotland in 1961–62 is £806,598,100, compared with £801,564,330 in 1960–61.[1] This is an increase of only £5,033,770; but in the past financial year the cost of the service has been exceptionally increased by back-payments under the terms of the report of the Royal Commission on the Remuneration of Doctors and Dentists. Appropriations-in-aid are expected to increase by £35,717,870 (from £170,697,440 to £206,415,310) as a result mostly of increased contributions by patients under the National Health Service Contributions Act. Thus the net cost to the Exchequer is expected to decrease by £30,684,100—from £630,866,890 to £600,182,790. The cost of the hospital, specialist, and ancillary services is estimated at £550,567,375, compared with £526,473,420 in the past year; included in this total is £34,730,000 for capital expenditure (£27,730,000 in 1960–61). The estimate for the general medical, dental, pharmaceutical, and supplementary ophthalmic services is £228,135,095, compared with £246,557,490 in the past year. The gross cost of the pharmaceutical services is estimated at £96,193,000, compared with £92,245,000 in the past year; but payments by patients are expected to increase from £12,663,000 to £23,116,000, and accordingly the net cost will fall by an estimated £6,505,000 to £73,077,000.

The total net expenditure of the Medical Research Council in 1961–62 is estimated at £5,599,000, a net increase of £1,130,440 on that in 1960–61.

1. Civil Estimates for the Year ending March 31, 1962. H.M. Stationery Office. 10*s*.

Conferences

FŒTAL ABNORMALITY

A CONFERENCE on the Recognition and Treatment of Fœtal Abnormality was held at the Royal College of Obstetricians and Gynæcologists on March 24.

PREVALENCE, GENETIC BACKGROUND, AND PATHOLOGY

Dr. AGNES MACGREGOR (Edinburgh) observed that perinatal mortality had been falling until 1950; but the fall had recently halted, and fluctuant rises in perinatal mortality had occurred in England, Wales, and Scotland. The figures for the U.K. were higher than those for some other countries. Congenital malformations were an important factor in perinatal mortality, and we had not yet reached the irreducible minimum figure for such malformations. The outlook had become more hopeful for the treatment of severe congenital anomalies. Patients who previously would have died could now be saved and even be enabled to have reasonable health.

Prof. THOMAS MCKEOWN (Birmingham) said that congenital malformations accounted for 20% of stillbirths and neonatal deaths. Out of every 1000 deliveries there were 17 offspring with congenital malformations, many of them multiple. Mortality among infants with even minor malformations was higher than that for normal infants. Observations regarding possible environmental factors responsible for malformations were confined to anencephalic fœtuses. These were more frequently found among first-born infants and among the offspring of 5th and subsequent pregnancies; there was a distinct association with maternal age and social class. These malformations also occurred 50% more often in infants delivered during December and January than among those delivered in June and July. This effect seemed to be independant of social class, maternal age, and birth order. Such effects

appeared to be additive. Other malformations with a seasonal distribution were congenital dislocation of the hip and patent ductus arteriosus. There was no demonstrable association between congenital malformation and infection with either poliomyelitis or influenza virus.

Dr. A. E. CLAIREAUX described the prevalence of congenital malformations among fœtuses and newborn infants studied during the perinatal-mortality survey in March, 1958. Fatal malformations accounted for 15% of all postmortem examinations carried out during this survey, and their prevalence was 4·6 per 1000 total births. A similar study of all births between 1951 and 1960 at Queen Charlotte's Hospital, London, showed a prevalence of 6·6 per 1000 births, and the affected offspring accounted for 14% of postmortem examinations. The prevalence of fatal congenital malformations was thus 0·5% of all births. The central nervous system was most commonly affected. Anencephalus and hydrocephalus were among the commonest malformations. The alimentary and cardiovascular systems were next in frequence. Multiple malformations were common (about a third of the total). Some obvious, easily treated malformations and another hidden, fatal defect could be present in the same infant.

Dr. A. C. STEVENSON (Oxford) said that environmental influences appeared to be stronger than genetic influences in the development of congenital malformation. Some genetic factor did, however, operate in the majority of cases. In some malformations a single simple inherited gene expression might operate, but this was not easily proved. It was easy to miss rare recessive traits in man. Many rare recessive traits were lethal, and the total contribution of such traits to congenital malformation was greater than that of well-known recessive characteristics. There was a great variation in the development of the fertilised ovum up to the blastocyst stage. Mutation to malformation might be the result of environmental influences in early phases of division of the ovum. Chromosome translocation might be associated with some anomalies. Dr. Stevenson made a plea for further intensive study of the outcome of consanguineous marriage in the U.K.

Prof. J. H. M. PINKERTON reported the results of 153 cases of severe malformation of the central nervous system. In 30 mothers subsequent pregnancies resulted in the birth of only 4 normal infants. There was thus a tendency for defects to be repeated. In a third of the patients the pregnancy was complicated by hydramnios, which was frequently associated with fœtal anencephaly. Some of the anencephalic fœtuses also showed pulmonary hypoplasia. In only 50% of cases was a congenital malformation diagnosed before delivery. Abdominal X-ray examination was of value in pregnancies complicated by hydramnios.

Mr. J. S. SCOTT (Liverpool) had investigated the outcome of 318 pregnancies complicated by hydramnios. In 131 the infant was grossly malformed. The remaining 187 infants appeared to be normal at birth, but subsequently 26 were found to have atresia of the alimentary tract. Œsophageal atresia was the commonest single lesion, and the œsophagus should be intubated in all apparently normal babies whose mother had suffered from hydramnios during pregnancy.

Dr. H. G. KOHLER (Birmingham) observed that an abnormal facies was not always associated with a severe renal lesion in the fœtus, even if the pregnancy had been complicated by hydramnios. Catheterisation of the infant's œsophagus was useful when hydramnios was found in pregnancy.

Dr. V. M. COFFEY (Dublin) stated that anencephalus was commoner in Dublin than in England. The prevalence of malformation was 8·6 per 1000 births compared with 1·5 per 1000 births in England, Wales, and Scotland. In some areas of Dublin the prevalence was as high as 1% of all births.

DIAGNOSIS AND TREATMENT

Dr. J. P. M. TIZARD described the clinical features associated with malformations of the respiratory system and of the alimentary tract. Some of the more serious heart lesions might even be amenable to surgery. Unfortunately in a high proportion of deaths resulting from severe cardiovascular malformation, the defects were extremely complex and were not easily remedied by surgery. At present, patent ductus arteriosus and coarctation of the aorta could be treated. Such patients presented with signs of cardiac failure rather than cyanosis. It was important to recognise the female pseudohermaphrodite as such patients could benefit from early therapy. Besides obvious anatomical malformation, disorders of metabolism were very important. Patients with galactosæmia and phenylketonuria were a challenge to early diagnosis and required prompt treatment.

Prof. A. W. WILKINSON observed that mortality-rates were high among infants with congenital anomalies, some of which were beyond the range of surgery. He emphasised the importance of early diagnosis and careful routine examination of the newborn infant. Patients with obvious lesions which were easily amenable to surgery might have severe hidden lesions which would subsequently prove fatal. Hydrocephalus which had been present for some time in utero was less responsive to treatment than hydrocephalus developing after birth. With modern techniques an increasing number of children could be saved. Conjoined twins and other fœtuses with large malformations should be delivered whole. The newborn infant stood operative interference well. In a number of centres expert teams of surgeons, anæsthetists, and nurses were available for the treatment of congenital malformation, and affected children should be sent to such centres.

Mr. R. G. CROSS (Dublin) described the results obtained from the institution of a preconception profertility regimen in patients whose previous pregnancies had ended in abortion or in the birth of a malformed fœtus. As soon as a fresh conception occurred an intensive therapeutic regimen was begun, and this was continued throughout the pregnancy. Good results were claimed in respect of the 20 patients reviewed to date.

Mr. D. M. FORREST dealt with the surgical problems involved in the treatment of congenital spina bifida and meningomyelocele deformities. Some infants with very severe defects did survive and required attention to make life less of a burden to themselves or their parents. If no sac was present and the malformed area was raw, with the spinal cord exposed, infection was inevitable. If a sac was present but only comprised a thin membrane, infection was likely. In such cases early operation was required—if possible, in the first 2–4 hours of life. Once the sac was closed and leakage of cerebrospinal fluid was prevented, hydrocephalus might develop, but this was no contraindication to early operation. Later treatment was required for defects in ambulatory patients, and bladder or sphincter defects were also a problem. When the defect was covered by membrane and tough skin, infection was not a problem, and patients did not require immediate operation. The development of hydrocephalus was always a danger. Reasonably good results were obtained when hydrocephalus developed after birth and was caught at an early stage. Results were less favourable when hydrocephalus had been present in utero. The long-term results depended on the severity of the original lesion. A normal expectation of life depended on the urinary state as well as on the neurological lesion. Paraplegia was often present and required attention. Mental development was nearly normal provided hydrocephalus had not developed rapidly and had not been present to any great extent during pregnancy. Such infants might survive and were in need of urgent treatment.

Sir ANDREW CLAYE (Leeds) touched on the ethical problems involved in the surgical treatment of congenital malformation. Such problems were sometimes difficult to resolve.

Dr. TIZARD also thought the ethical problems difficult and suggested that doctors should not act as judges in these matters.

STRUCTURE AND SYNTHESIS OF MACROMOLECULES

A SYMPOSIUM under this title was held in London on March 27–28 as part of the meetings held to mark the 50th anniversary of the foundation of the Biochemical Society.

After an introduction by Prof. F. G. YOUNG, Dr. PAUL DOTY spoke of recent studies on the Structure of Polynucleotides and the Properties of Nucleic Acids. He showed that much could be learnt concerning the hydrogen bonding of pairs of bases by the study of enzymically synthesised high-molecular-weight polynucleotides and polydeoxyribonucleotides. A number of two- and three-stranded helical complexes can be formed by mixing two different homopolymers. In copoly-nucleotides extensive base pairing occurs by the formation of short helical ergions patterned after the deoxyribonucleic-acid helix. A few bases can loop out of the helix in order to permit the Watson-Crick pairs to form in sequence. It has also been possible to obtain helices composed of one polyribonucleic-acid chain and one polydeoxyribonucleic-acid chain. Suggestive evidence for the occurrence of ribonucleic-acid/deoxy-ribonucleic-acid helical complexes in vivo has also been obtained.

Prof. J. N. DAVIDSON reviewed recent work on the biochemical aspects of polynucleotide biosynthesis. In particular he discussed the mechanisms which control deoxyribopoly-nucleotide biosynthesis and the intracellular site at which it takes place.

After an excellent review of the Structure of Polysaccharides by Prof. E. L. HIRST, Dr. W. Z. HASSID discussed recent work on the Biosynthesis of Polysaccharides. In this field particular interest attaches to the role of the sugar nucleotides. Although most of these contain uridine, other bases are also found. The biosynthesis of many different types of complex saccharides such as glycogen, amylopectin, and chitin is now known to occur through such intermediates.

The Structure of Proteins was discussed by Dr. M. F. Perutz, Protein Structure in Relation to Enzymic Activity by Dr. E. L. Smith, and Control of Adaptive Enzyme Synthesis by Dr. J. Monod.

Dr. PERUTZ showed how the results of X-ray crystallography could be used, not only to give a picture of three-dimensional structure of proteins such as myoglobin and hæmoglobin, but also to give some information concerning the order of occurrence of different aminoacids in the polypeptide chain. The results obtained may be compared with those employing conventional sequence studies. Interest is centred on the arrangement of the aminoacids at the many corners of the polypeptic chains known to be present in both the hæmoglobin and myoglobin molecules.

Dr. SMITH ended his lecture by a description of the work of his group on the structure of that part of the polypeptide chain of papain which is essential for its enzyme activity. A fragment has been obtained which contains approximately 76 aminoacid residues, and which appears to represent the carboxyl terminal portion of the papain molecule. The structural studies of intact papain have permitted the tentative elucidation of the sequence of aminoacids in this portion of the molecule.

Finally Dr. MONOD discussed the properties of the intermediates through which structural information for the synthesis of protein is conveyed from the genes to the cytoplasmic enzyme-forming centres. A ribonucleic-acid fraction with the required properties has been shown to exist in bacterial cells. Preliminary experiments confirm the hypothesis that this fraction serves as a " messenger " between the structural genes and the ribosomes (ribonucleoprotein particles) where the synthesis of enzyme takes place.

High expectations were placed on this symposium. That those who attended were not disappointed was shown by the capacity audience throughout the meeting, and the intense interest in the papers.

In England Now

A Running Commentary by Peripatetic Correspondents

LET me lose but 3*d*. down the back of the sofa and my reactions are such that male nurses come and remove my razor and pyjama-cord. The vulgarity of the burst of emotion would justly provoke the curled lip at the Ministry of Transport, where Maharajah Marples has nonchalantly announced that British Railways are losing money at the rate of £300,000 a day. Whether this is quite the Message that the World Has Been Waiting For may be doubted by the carbon-coated traveller, watching his Treasury-notes being sucked in through the booking-office window as though by a high vacuum.

It might, he feels, be cheaper and quicker to leave the trains alone and just move the stations about. Nevertheless someone must work pretty hard just to lose so much money so fast. A certain amount more could be done of course by firing-up locomotives with bank-notes, by burning them on those welcoming waiting-room fires, and by disposing of them when the train is not standing at the station. Then perhaps those trucks marked URGENT! PERISHABLE! seen sinking into decay on grass-grown sidings are heavy with forgotten gold.

In an interview exclusive to *The Lancet*, a key-man in the British Railways underground movement, and a good steady worker—any steadier and he'd take root—reported that pennies getting stuck in the slots and the pilfering of wash-basin plugs had a lot to do with it.

"So shall thy poverty come as one that travelleth, and thy want as an armed man," said he, getting his foot smartly on to a fag-end, and going on to claim that he, like Dr. Beeching, had a brilliant mind, considerable experience over a wide field of Industry (15 jobs in six months), and great skill in negotiating, plus the indispensable qualification of having no experience whatever in railway management which would ensure an unbiased approach to the problem. All these qualities, said this self-effacing chap leaning enthusiastically on his mop while the tea brewed, he would sacrifice on the altars of British Railways for as little as £24,000 a year, plus of course time-and-a-half. No, he didn't think fares were too high: that was just a rumour put about by people who couldn't afford to pay them, and it's no good you rattling that knob like that, young fellow, because the lock's bust. You'll have to climb over the top . . .

* * *

Since the gesturing mid-European hand ended up more often on the left flank than elsewhere, I made a houseman's diagnosis of renal colic, with diverticulitis as another possibility. I was frankly a little contemptuous of the Casualty Officer's suggestion of cystitis. My Registrar obtained a different set of symptoms and diagnosed subacute obstruction. Anyway, the man was ill and needed pethidine. Sister took a long hard look and said " Phoney." I was horrified at such a display of pathological suspicion; but a week (and many doses of pethidine) later, notes from another hospital confirmed him as a Münchausen.

" On take " a week later we admitted another tricky problem. Active duodenal ulcer with a good deal of functional overlay we thought. Better admit just in case. Sister, preparing to go off duty, was pulling her gloves on in the corridor as the patient was wheeled past. " Perf.", she said, "and I shouldn't be surprised if he's mental into the bargain." Laparotomy confirmed the first part of the diagnosis and postoperative course the second, when a manic psychosis developed a few days later.

It's beginning to get like one of those telepathy games on T.V. Just lead her to the patient and she does the rest. We're wondering if she'd do as well blindfold, but we haven't the nerve to suggest it. Anyway we don't ask for straight abdominal X-rays any more, and blood-tests on emergency admissions are pointless when they merely confirm her clinical impression. We still do amylases though. Acute pancreatitis is not her forte. She gets a lot of difficulty telling it, at a glance I mean, from a really nasty perf. If only we can iron out this minor

blemish in technique, she will achieve new diagnostic stature. The physicians have now heard of her. They rather disapprove of the whole business. Unscientific or something. . . .

* * *

Most of the criticism of the new translation of the Bible has been directed at changes in language where changes were not essential. When the eminent and to some extent anonymous scholars tackle the Old Testament I hope they will not tamper with *Proverbs*, XXXI, 5–6, for it has served me as a valuable "second opinion".

Old Mrs. McCue was confined to bed and her progress was slow. Since more orthodox therapy was not producing very rapid results, I thought that a peg of whisky might be advantageous. My suggestion was greeted with horror, and she was adamant in her refusal. The "Good Book" expressly forbade the ingestion of strong drink, and, as she put it, she "had never lipped it". Like so many of the older generation of Glenroy, she had a Bible on the top of her bedside table. When I asked her if she would accept the authority of the Bible for the use of alcohol in illness she agreed, but she said she knew it didn't. It did not take a moment to turn up the *Book of Proverbs* where I read to her:

> Give strong drink unto him that is ready to perish, and wine unto those that be of heavy hearts.
>
> Let him drink, and forget his poverty, and remember his misery no more.

It worked. She improved; she got on her feet; and I soon was able to stop visiting her. However, about a year later I met her son-in-law who complained bitterly that it was costing him a fortune for whisky.

* * *

I was washing my hands under the tap in the farmhouse kitchen, a process which sends a fine spray of water down the front of the coat, when the supply was suddenly cut off.

"Oh, has it gone off?" said the farmer's wife. "That'll be the cows drinking."

By this she meant that a drinking trough up the field, fitted with a ball-tap, took the rising main before the farmhouse; but the incident was symbolic. On a dairy farm the cows come first.

I was reminded of a morning when an agitated farmer met me in the stackyard and said, with staggering frankness, "You go on up, doctor. You know where to find the wife. It'll be her usual trouble, I'm thinking. Right now I'm more worried about one of the cows. Can't get her on her feet no how. I'm just waiting here of the vet coming."

* * *

SUBVERSION AND THE CELL

Carbon (C) and Hydrogen and Nitrogen and O
Are four among the cleverest of the elements I know:
Four quite different valencies and four atomic weights
Distinguish C from Oxygen and Nitrogen from H.
Distinctive individuals, like four ambitious men,
Are Hydrogen and Oxygen and Carbon (C) and N—
And Hydrogen and Nitrogen and Oxygen and C
Once set aside their differences and the end-result was me.

But Nature is not simple nor her policies naïve;
The tricks that she gets up to one might sometimes scarce believe;
As soon as we've deciphered them she blasts our modest hopes
And multiplies our problems by producing isotopes.
Yet even this were bearable if H, like C and O,
Were constant and reliable; but not with Nature, no.
Alas, that H should masquerade as D and even T
When simple N and O and C are always N, O, C!

For now mistrust is everywhere—cabals and factions grow—
If N combines with Hydrogen then C allies with O.
Team-spirit is a virtue, but the learned all agree
That harm as well as benefit results from NH_3.
And though one must be grateful, all in all, for CO_2
One rightly feels repugnance for the ill CO can do.
It's tempting to imagine that some cells must yearn for troops
To quell the wilder radicals and reactionary groups.

Letters to the Editor

HOSPITAL DOCTORS

SIR,—Your leader of March 25 is a useful stimulus to discussion on the report of the Platt working party. Your reference to the possible extension downwards of the consultant grade to absorb senior registrars is an idea which had considerable support in the past.

Evidence for the Royal Commission and the Platt report was collected in 1957–58, and at that time the Medical Practitioners' Union submitted evidence to both these bodies which included a detailed working out of a salary structure for the consultant grade, with extensions downwards to enable a compromise to be reached and time-expired senior registrars to be found a place as junior consultants. In 1961 the Platt working party has rejected this proposal, and I feel that this necessarily follows from the nature of the compromise which this report represents.

The views of the professional side on the Joint Consultants Committee should now have been met by the recommendation to review the staff position in all hospital regions, and to put forward proposals for additional consultant appointments to meet the needs of hospitals which are understaffed. Alongside this development for the consultant grade, a new subconsultant grade is to be introduced to meet the wishes of the Ministry who have been anxious to provide a more stable staff structure for regional-board hospitals where the training of senior registrars is not carried out and where insufficient junior staff are available. This new medical assistant grade will enable registrars, who are moving from one two-year post to another, to find a suitable niche, and will enable junior hospital medical officers who have no prospects within the existing structure to seek promotion in the hospital service. These are some of the reasons why every effort should be made to see the implementation of this report without delay. The reorganisation of the consultant grade, with the issue of new contracts where required, will also greatly help certain hospitals.

It seems likely that the increase in consultant appointments following the review of staff in all areas will absorb many of the time-expired senior registrars. It is also a fact that we are now facing an increased rate of retirement in the consultant grade during the next five years. Taken together these circumstances may lead to a shortage of consultants for available vacancies in some specialties. It is important that all these facts should be made available and published so that senior-registrar posts can be adjusted and young doctors can be encouraged to enter the hospital service to meet its needs.

It is a matter for regret that it is more than ten years since these problems were first posed, and it is only now that we have before us a workable compromise. The intervening period has been marked by much personal frustration and suffering by a generation of doctors who, having seen military service in the late war, were brought home to believe that a place would be found for them in the new hospital service. The consequences to the whole medical profession have been very serious. Undoubtedly a measure of the blame for these blows must be laid at the door of the responsible authority—the Government. However, since only the profession stood to lose by these delays, it seems to be not unreasonable to suppose that the methods whereby we select our negotiators might be at fault. The very distinguished men at the head of our affairs are not appointed to the presidencies of colleges because of their ability to strike a hard bargain on our behalf. It is doubtful whether they have the necessary ability to negotiate with the highly subtle trained minds who represent the Ministry on these occasions. The need to select and train our own negotiators is a matter of

urgent importance. A general overhaul of the negotiating machinery is urgently necessary.

Bushey, Herts. P. WATNEY ROE.

SIR,—Your leader of March 25 sees the answer to outpatient waiting-lists in the creation of, in effect, utility appointments—i.e., clinical consultants with limited beds.

You make no reference to the fact that we have already many consultants in peripheral hospitals with several years' experience of such practice. Learning to live with a chronic bed shortage necessitates a complete reorientation to medical and sometimes human values. In this readjustment we may derive benefit from our more objective viewpoint, but this is small consolation compared with the daily problems of bed shortage.

Surely there can be no argument that a balance must be struck between inpatient and outpatient work, both in the interests of patient and doctor, and that in many hospitals this balance is top heavy. Such new appointments as you suggest can but accentuate this trouble.

In certain medical and administrative circles it may be important to " dispel the prevalent respect for number of beds as the clinical consultant's status symbol ", but this is hardly evidence in support of your views. In the periphery, consultants view hospital beds not as " status symbols " but as a necessity for practice.

Lincoln. E. P. MORLEY.

SIR,—Your editorial of March 25 on the Platt report must have heartened many a time-expired senior registrar whose confidence had been shattered by the apparent indifference of this working party to our plight. This indifference may, we fear, be shared by far too many members of the Joint Consultants Committee, a group which it appears the Minister will consult when considering additional consultant appointments and a group which has hitherto done very little to promote additional consultant posts.

We have not undergone this long period of training and waiting to find ourselves left at the top of an extremely amorphous mass of " medical assistants ". If this is allowed to happen, it will involve far more exploitation of highly trained skills than was ever achieved by the misuse of the senior hospital medical officer grade.

We hope your editorial will stimulate the Minister of Health to find a quick and sensible way of using our skills and ability not only in our chosen profession but also in our chosen specialties.

TIME-EXPIRED SENIOR REGISTRAR I.

SIR,—The findings of the Platt working-party are basically acceptable though by no means new.

The new grade of medical assistants proposed by the working party must not develop into another S.H.M.O. complex. But a number of problems remain to be solved if this is to be prevented:

1. A clear delineation of the " special class " of work suitable for such a grade will be needed. It may be noted that no such class of work was definable for senior registrars.

2 With this goes the assessment of the number of new consultants needed. For such an assessment a specification of consultant responsibility will be required more precise than " absolute charge of patients " and more comprehensive than " visiting two or three times a week ". As soon as a consultant has more beds than he can properly care for, delegation of authority becomes a formality. (I have had simultaneously the experience of signing all the letters of one chief because of his absence and having mine signed by another chief to show his ultimate responsibility.) Without a precise numerical guide, boards and their advisers will continue to be influenced, in their decisions on new appointments, by many factors of doubtful national significance.

3. The wide scale envisaged for medical assistants will have to take into consideration the close working and social relationships, and the personal equality, of men who may be junior in status to their colleagues but senior in age. Past experience of the financial affairs of those whose status does not allow them to exercise pressure does not encourage confidence.

There still remains the need for a solution for those, like myself, who have been left behind in what the working party agrees to be a disadvantageous position in the battle for promotion as against teaching-hospital trainees. If current rumour is accurate it would also appear that those who chose to leave the " training ladder " for S.H.M.O. positions are likely, on present views, to be much better placed. It will not help us that our position will not recur. Unless this consequence of the confused past is cleared up, the profession is going to be left for years with an unhappy group of men, whose persistence in a miserable situation and whose regular reappointment seems to have demonstrated both the will and the ability to become independent members of a hospital staff.

TIME-EXPIRED SENIOR REGISTRAR II.

BRONCHITIS AND THE MINISTRY OF LABOUR

SIR,—In his letter of March 25 Dr. MacLean, principal medical officer of Remploy Ltd., complains that your annotation of Jan. 21 might suggest that in this country very little sheltered work is provided for those with chronic bronchitis. He states that " at the moment about 350 of those disabled by chronic bronchitis and emphysema are employed in Remploy factories ".

In the House of Lords on March 14 the Earl of Dundee, in reply to Lord Taylor, stated that " there were 43,404 men and women classified as being disabled on account of bronchitis, bronchiectasis, and emphysema. Of these 5500 were registered as unemployed, but no information is available as to how many of the balance were in employment, nor how many were in receipt of sickness benefit ". To a further question from Lord Taylor, the Earl of Dundee replied: " Altogether, some 82,000 persons were receiving sickness benefit for bronchitis of some kind on May 30, 1959, the latest date for which figures are available, and at this time of the year the number may be higher."

These figures may give some idea of the size of the problem. For those 350 bronchitics referred to by Dr. MacLean Remploy provides a satisfactory solution to their employment, difficulties. It must be obvious, however, that this small number represents only a fraction of those needing help.

In a recent survey on the unemployment problems associated with chronic bronchitis [1] we showed that only 1 in 6 of moderately severe bronchitics were registered as disabled with the Ministry of Labour. Furthermore, of 58 bronchitics who were not registered as disabled 18 were considered by their doctors to require sheltered work. The main reason for failure to register was reluctance on the part of the doctor who, from previous experience, regarded it as a waste of time to refer the disabled bronchitic. The Earl of Dundee, again in reply to Lord Taylor, on March 15 stated: " Very large numbers of bronchitics do not register, either because their medical practitioners do not advise them to do it—they do not think it would be worth while—or maybe, because they think it is not much use registering since the opportunities of employment are not great enough."

The unemployment problem of those disabled by bronchitis has been hidden for too long in the sickness benefit figures of the Ministry of Pensions and National Insurance. Many of

1. Caplin, M., Silver, C. P. *Brit. J. Dis. Chest*, 1960, **54**, 297.

these men are fit for light work or sheltered work, but they remain on sickness benefit because such work is not available. Appreciation of this problem would help disabled persons generally, because what has been said of bronchitis in this connection is true for many disabilities. It seems to us that the present arrangements for helping the disabled, though in themselves valuable, are not on the scale that the problem demands.

There is no simple solution. Greater use could be made of the powers conferred by the Disabled Persons (Employment) Acts, 1944 and 1958. More strict enforcement of the quota system, the training of the older unskilled man, and an increase in scheduled occupations would help those fit for ordinary light work. More Remploy factories are needed, but in view of the high cost of establishing them and their serious operating loss their growth must be slow. In 1958 there were 6200 workers employed with an operating loss of approximately £450 a man per annum. The average wage was £389 per annum, and the present waiting-list is over 2000.

Voluntary schemes for the employment of the elderly have been operating on a local basis for several years. We suggest that a similar scheme, but with official help and on an industrial plane, could be run for bronchitics, and indeed all disabled, on a local basis. A voluntary organisation, perhaps linked with the district disablement advisory committee, should allow lower running costs and greater flexibility. Its local character would allow use to be made of local goodwill. There would be knowledge of local facilities, and of the disabled themselves and their living conditions. Its size and character could be related to local needs and industries. Travelling, a serious problem for nearly all disabled, would be reduced and the integration of homework with the sheltered workshop would be possible.

Modern treatment is tending to slow the progress of bronchitis so that many will survive to become future unemployment problems. The proper management of chronic disease must include the provision of suitable work.

Tuberculosis Dispensary,
The London Chest Hospital,
London, E.2.

MAXWELL CAPLIN
C. P. SILVER.

PAVLOV OR FREUD

SIR,—In your leading article (March 4) you do not distinguish between the theories of Pavlov himself, and those of the behaviourists whose approach is " based " on Pavlov's experiments on conditioning. The behaviourists appear to rely mainly on conditioning as a mode of therapy. Pavlov was not in fact a behaviourist, and he did not advocate conditioned-reflex therapy in the treatment of neuroses.

Prof. K. S. Lashley [1] had this to say about Pavlov and conditioned reflexes (written Feb. 8, 1946):

" The conditioned reflex offered a potential method for study of psychological processes." . . . Pavlov " pointed the way to fundamental investigation of the physiology of the brain. This way, unfortunately, was not followed systematically in America and very little was added to further analysis of cerebral functions with the help of his method. Paradoxically many psychologists (the behaviourists) in whose current work the influence of Pavlov's theories can be most clearly traced have turned to the development of conceptual systems from which all neurological interpretations are rigorously excluded. The chief influence on psychology . . . of conditioned reflex theory seems to have been diametrically opposed to Pavlov's expectations of using his studies as a basis for the physiological explanation of behaviour. All this is no fault of Pavlov. He was one of the great pioneers in experimental and inductive reasoning."

It appears therefore that to define human behaviour and neuroses merely in terms of " learning " and " conditioning " would be to ignore many other aspects of cerebral function, such as " thought " and " ideas ", and the neurophysiological processes responsible for these. The behaviouristic approach also ignores the hereditary factors in normal and abnormal human thought and behaviour. The constitutional factor in neuroses was stressed by Pavlov even in his experimental animals. It is also of interest that Pavlov treated experimentally induced neuroses in dogs by drug therapy (bromides) and rest.[2]

The conditioned reflex is undoubtedly an established pattern in cerebral activity; but this forms only part of the intricate cerebral physiology. It also appears that the data derived from animal experiments will have to be elaborated and modified in order to apply them to man. The more developed " association fibres " in man naturally have a greater effect on the elaboration of the conditioned reflex.

In conclusion, then, I feel that to view human behaviour in terms of " conditioning " alone is a rather superficial approach; and treatment by conditioning can have little claim to being scientific. But Pavlov's original theories provide a basis for the scientific study of neurophysiology.

London, N.W.3. S. SAMENT.

USELESS QUARANTINE ?

SIR,—Colonel Foster (April 1) states he had heard of two children from different families being kept away from school for a month because they were mumps contacts. I wonder if he confirmed this with his local health department, for it is not official policy to exclude from school contacts of cases of german measles, mumps, or chickenpox.

Town Hall,
Romford.

F. GROARKE
Medical Officer of Health.

ANACHRONISTIC PROCEDURES IN MENTAL HOSPITALS

SIR,—Dr. Oliver, in his letter on sex and psychiatry (March 18), drew attention to the anachronism of consultants in mental hospitals working with male or female patients but seldom with both. I would like to draw attention to another in the hope that it too will soon be abolished.

I refer to the practice of obtaining from the nearest relative signed consent to giving electroconvulsive therapy (E.C.T.) to a patient. This might be necessary in the case of some " section " patients, but is it really necessary for informal patients who now constitute upwards of 90% of mental-hospital admissions ? Surely it is the responsibility of the patient's doctor to decide whether or not E.C.T. is indicated and, if it is, to tell the patient and persuade him to accept it. After all, the consent of the next-of-kin is not sought before surgical procedures are undertaken in a general hospital when the patient is legally of age to give consent himself; so why should not informal patients in mental hospitals be accorded the same respect ? Admittedly, only very few next-of-kin refuse; but sometimes much valuable time is lost in tracing them when the patient himself is able, and very willing, to give consent himself so as to begin treatment without delay.

In any case, consent by the next-of-kin is not worth the paper it is written on, either clinically or in a court of law. An informal patient who refuses cannot be forced to have treatment, however many members of his family have given their consent. Conversely, it would be tantamount to professional negligence if the doctor refused to treat a patient who urgently required treatment, and had agreed to have it, merely because the relatives either cannot be found or refuse to consent. This applies just as much to " section " patients as to informal ones.

Other treatments with a higher potential morbidity and/or mortality are prescribed and given not only without the prior consent of the next-of-kin, but without that of the patient himself. In particular the administration, parenterally or by mouth, of tranquillisers can precipitate some very complex cerebrovascular and cardiovascular complications, not to

1. Lashley, K. S. Cited by B. P. Babkin *in* Pavlov: a Biography. London, 1951.

2. Pavlov, I. P. Conditioned Reflexes: an Investigation of the Physiological Activity of the Cerebral Cortex. London, 1927.

mention the risk of liver damage. These complications are infrequent; but with E.C.T., properly administered with an intravenous barbiturate and enough muscle relaxant, they are unknown; and the other complications of "straight" E.C.T. are now a thing of the past.

The signing by the next-of-kin of the E.C.T.-consent form is a vestigial remnant; and it could now be abolished; the patient would benefit and so would the relatives, who should not have the responsibility of deciding whether or not E.C.T. is the best way to treat the patient. That is the psychiatrist's job; and he is equipped by his years of training and experience to decide.

Brookwood Hospital, Woking, Surrey. G. F. J. GODDARD.

NEONATAL VARICELLA

SIR,—In their article of March 25, Dr. Readett and Dr. McGibbon say they could find "no published cases of extrauterine infection in the neonatal period, and so we report 2 cases . . ."

I reported [1] a case of varicella in the neonatal period in 1951 under the title No Inherited Immunity. The lesions appeared 16 days after birth in both mother and infant. As far as the child was concerned there was an extensive crop of vesicles all over the body. An unusual feature of this case was that the child developed an acute otitis media a month later, in itself an uncommon complication of varicella.

London, N.W.11. BERNARD HOMA.

"A DEPARTURE FROM NORMAL PRACTICE"

SIR,—As a psychiatrist in general practice I should like to support Dr. Tredgold and Dr. Soddy (March 25) à propos the Landau-Werner case, particularly in their contention that medical treatment in general and psychotherapy in particular cannot always be limited to the consulting-room if one is to do one's job properly.

It can and does happen, either during a long illness or when the acute phase of a sudden illness is over, that the only person who can give the patient sufficient confidence to go out into society again may be the doctor, and then only if he is prepared to be *personally* responsible for the first, and if necessary, subsequent steps. If he cannot, or will not, help at this stage, then he is letting the patient down; to my mind there is no doubt about this at all. Of course one runs the risk of making mistakes as to when and how practical help should be given, just as one may make mistakes as to when and how penicillin or E.C.T. should be given—but one must have the courage of one's convictions, and if there are many occasions on which psychotherapy in the consulting-room is the best one can do, there are others on which psychotherapy on the dance floor would be much better.

It seems to me a grave reflection on our society if genuinely disinterested efforts to help a patient are to be rewarded with financial ruin. Let us hope that this is an isolated instance, but surely, Sir, this is an occasion on which the B.M.A. could, and should take action.

Cambridge. A. I. ROUGHTON.

SIR,—I read with interest the letter by Dr. Tredgold and Dr. Soddy. It seems to me the important point is a medicolegal one.

An error of judgment is not negligence, but according to this ruling a "departure from normal practice" *is* negligence. Every medical man may at some time depart from normal practice with benefit to his patients. Many great discoveries and much progress have been made by such a procedure. By this token, even Lord Lister may have been considered negligent.

London, W.1. M. W. BROWDY.

1. *Brit. med. J.* 1951, i, 1451.

A SURGICAL DRESSING

SIR,—I was interested to read the letter from Mr. Montgomery (March 11) and of his experience with the tulle dressing impregnated with 1% 'Viacutan' (silver dinaphthylmethane disulphonate, methargen) in the treatment of wounds of all kinds. I was particularly interested to learn that he has used it in the treatment of varicose ulcers as I have used it almost exclusively for this condition in the past two years or more.

I apply the viacutan tulle directly to the ulcer and bandage the leg from the toes to the tibial tubercle with an 'Ichthopaste' bandage with a good pad of cotton-wool over the situation of the ulcer. Over this I apply a 4 in. crepe bandage.

The results have been uniformly good and have been particularly gratifying in ulcers of long standing. More recently I tried adding a piece of 'Dequadin' tulle (Allen and Hanburys) over the viacutan tulle, and I am sure that this combination produces results even better than when viacutan tulle is used alone.

London Varicose Clinic, Battersea, London, S.W.11. R. SIMPSON HARVEY.

BLOOD FIBRINOLYTIC ACTIVITY IN WHITE AND BANTU SUBJECTS

SIR,—May we comment on Dr. Fearnley's reply (March 4) to our letter (Feb. 18)?

The essential point of our letter was to draw attention to the finding that, in the two racial groups on similar diets and under similar conditions, on occasion there was a significant difference in blood fibrinolytic activity in white and Bantu subjects, whereas on other occasions the difference in mean clot-lysis times was insignificant. This appeared to be due largely to the great variability in blood fibrinolytic activity of a number of the individuals when tested on separate occasions.

We were aware that physical activity, diurnal variability, and alimentary lipæmia may influence blood fibrinolytic activity, but, since our experiment was carried out under standard conditions for both racial groups, and blood was collected from fasting subjects at approximately the same time of day, we assumed that the influence of these factors would be similar for both groups, and would not enter into our results. We did not imply that the experimental technique per se was at fault, but rather wished to stress that, since great variability was shown by many subjects when tested on separate occasions, comparative studies using this or any other technique based on a single estimation of blood fibrinolytic activity would not warrant firm conclusions.

The following examples of clot-lysis times illustrate the results we obtained on different occasions:

Volunteer N 17: 5·7, 5·3, and 4·9 hours.
Volunteer B 2: 3·1, 3·0, and 3·8 hours.
Volunteer N 11: 4·1, 10·3, and 9·3 hours.
Volunteer B 1: 3·4, 21·4, and 7·9 hours.

While the first 2 volunteers varied insignificantly when tested on the three occasions, in the 3rd and 4th a highly significant variation was noted.

Our results, which were based on estimations in triplicate of clot-lysis time on a single specimen of blood tested on three separate occasions, have been subjected to analysis of variance, and the findings for the white subjects are as follows:

Source of variation	*Degrees of freedom*	*Sum of squares*	*Mean square*	*F*	
Individuals	43	3426·7	79·7	79·7 / 38·8	2·05
Time	2	509·0	254·5	254·5 / 38·8	6·56
Interaction	86	3337·7	38·8		
Error	264	134·9	0·51	38·8 / 0·51	76·1
Total	395	7408·3			

It is clearly apparent, firstly, that the technical error of the method is significantly small relative to the variation between

individuals tested at the same time, or within individuals tested on separate occasions; and, secondly, that the latter two variations are also significantly different from each other. While these findings confirm the precision of the experimental technique, they emphasise its unsuitability for comparison of individuals based on single estimations. No conclusions can be drawn from these results as to the reasons for the great variability in some individuals tested on separate occasions.

We have never assumed that blood fibrinolytic activity ought to remain constant in an individual, and that, if it is not found to be so, the technique of measurement must be faulty. We rather wished to stress the possibility of unknown variables being inherent either in the technique as a whole or in the method of collecting blood. Dr. Fearnley has drawn attention both to the influence of faulty venepuncture, and to the importance of natural variability. The latter observation appears to be amply confirmed both in his studies and ours, and is a further example of the unknown factors precluding conclusions being drawn from comparative studies of blood fibrinolytic activity based on a single estimation.

Ernest Oppenheimer Heart Research Unit, South African Institute for Medical Research, Johannesburg.

A. ANTONIS
I. BERSOHN.

MORTALITY FROM CORONARY HEART-DISEASE IN INDIAN POPULATIONS

SIR,—It is stimulating to read that Dr. Walker (March 4) is making observations to clarify the ætiology of coronary heart-disease (C.H.D.) among Indian populations (Hindu and Moslem) in Johannesburg and Pretoria. It will be interesting to compare his results with similar investigations which we carried out on different classes of Indians in Kenya,[1] where the morbidity and mortality are high, as they are in Kampala and Durban. It is noteworthy that Dr. Walker's experiences in South Africa confirm our finding in Kenya that there is a high incidence of C.H.D. on a diet containing a liberal amount of vegetable oil.

Indian doctors in Kenya have observed that Gujarati vegetarians who consume a comparatively high quantity of vegetable oils and low quota of animal fats are no less susceptible to C.H.D. than other sections such as Gujarati non-vegetarians, Punjabi vegetarians, Sikhs, and Punjabi non-vegetarians. It will be of value to ascertain whether Dr. Walker's research leads to similar findings, since Muir,[2] from a study of necropsies in Singapore, formed a contrary opinion, reporting that the Indian Muslim seemed twice as liable to die from C.H.D. as his non-Muslim compatriot.

Several workers are now doubting the significance of fat as an important ætiological factor, such as Malhotra and Pathania,[3] working in the Punjab, who found that the fat content of diet taken by the vast majority of their patients was poor compared to European standards. Similarly, Friedman and Rosenman [4] pointed out that the fat intake of several races is comparable to that of the middle-class or upper-class American, though their incidence of C.H.D. is almost non-existent. Rosenman and Friedman [5] think it unreasonable to ascribe the pronounced increase of myocardial infarction in the United States and in England to any significant increase either of the plasma-cholesterol or of the dietary fat intake. Page et al.[6] found that a high fat intake in the Navajo Indians was associated with a low incidence of myocardial infarction, though their findings are criticised by Keys et al.[7]

It is certainly difficult to attribute the enormous rise in C.H.D. I have observed among Europeans in Kenya since the late war to any noticeable change in fat intake.

Further research into the comparative incidence of C.H.D. among different Indian communities in South Africa, East Africa, and India itself should contribute to this controversial subject. It is, however, important that such research should not be too long delayed, since Indians in East Africa are tending to become less strict in their dietary habits.

Nairobi, Kenya. A. D. CHARTERS.

NEEDS AND BEDS

SIR,—The run down of long-stay mental hospital beds envisaged by the Minister and the Ministry of Health [1] will have initiated a backpedalling race between mental hospitals in the anticipation that the present total bed complement of 3500 per million population will be reduced by one half during the next 15 years, to be followed by the ruthless demolition of old asylums and their replacement by small psychiatric units in general hospitals.

The run down rate in any hospital, however, will depend on its number of beds per population of the area served. Those hospitals with over 3·5 beds per 1000 population can make an early start to reduce the surplus beds, but they will have a long way to go to reach the proposed ratio of 1·8 per 1000. Other hospitals will not have to travel so far; and in one mental hospital the race has already been won, since Middlewood with 2000 beds serving a population of 1,125,000 has been on the target area for several years.

It will be of interest to observe the similar trend of events in New York State which started at 6 mental hospital beds per 1000 population. Having achieved the desired reduction of beds, hospitals will face the problem of establishing and maintaining the optimum internal ratio of long, medium, and short stay beds at 50%, 30%, and 20% respectively against the constant pressure of the former invading the latter. Psychiatry has received a challenge!

Middlewood Hospital, Sheffield. F. T. THORPE.

CONSCIOUSNESS DURING CURARISATION

SIR,—The following example of consciousness during curarisation may be of interest.

A youth of seventeen (weight 63 kg.) from a rural area had severe tetanus. Conservative treatment with chlorpromazine and barbiturates having proved unsatisfactory, tracheostomy was carried out, and a regimen of total curarisation and intermittent positive-pressure breathing instituted. This was maintained for thirteen days and he recovered completely. During this period he received an average of 340 mg. of *d*-tubocurarine every twenty-four hours. He was also given promethazine hydrochloride 25 mg. twice daily, phenobarbitone 65 mg. twice daily, and antibiotics. The ventilating pump was adjusted so as to maintain an arterial pCO_2 of about 35 mm. Hg, as determined indirectly by a rebreathing method in conjunction with an infra-red CO_2 analyser. The routine for administering the relaxant was that a dose of 20 mg. was given via an indwelling intravenous needle (Gordh) whenever the patient moved.

When this regimen was stopped and he was able to speak, he stated that he had been conscious for most of the time, confirming this by accurately reporting conversations he had overheard. Fortunately he was of a phlegmatic temperament and did not appear to have been unduly distressed by this experience; in fact he claims that his chief emotions were of frustration at his inability to communicate, and of extreme boredom, particularly at night when he believed that he only slept for some two to three hours. It seems that there was some analgesia as he experienced little or no discomfort from quite numerous venepunctures, but he found tracheal toilet unpleasant.

1. Charters, A. D. Arya,, B. P. *Lancet*, 1960, i, 288.
2. Muir, C. S. *Brit. Heart J.* 1960, **22**, 45.
3. Malhotra, R. P., Pathania, N. S. *Brit. med. J.* 1958, ii, 528.
4. Friedman, M., Rosenman, R. H. *Circulation*, 1957, **16**, 339.
5. Rosenman, R. H., Friedman, M. *Calif. med. J.* 1958, **89**, 169.
6. Page, I. H., Lewis, L. A., Gilbert, J. *Circulation*, 1956, **13**, 675.
7. Keys, A., Kimura, N., Kusakawa, A., Bronte-Stewart, B., Larsen, N., Keys, M. H. *Ann. intern. Med.* 1958, **48**, 83.

1. Tooth, G. C., Brooke, E. M. *Lancet*, April 1, 1961, p. 710.

Two patients with tetanus, previously treated in a similar manner at this hospital, did not remember the period of curarisation at all, but their pCO_2 levels were not monitored, and possibly greater hyperventilation was present. Furthermore, a greater weight-for-weight dosage of barbiturate was given in these cases, and it would seem wise to be more generous with sedation in future, provided no undesirable side-effects ensue, to prevent what could clearly be a most distressing experience.

Western Hospital, London, S.W.6. P. H. BYLES.

PNEUMOTHORAX IN STAPHYLOCOCCAL PNEUMONIA

SIR,—Dr. Olesen and Dr. Quaade (March 11, p. 535) emphasise two interesting facts: (1) the rarity of spontaneous pneumothorax as a complication of staphylococcal pneumonia in adults; and (2) the possible relationship between this complication and steroid therapy.

In our paper [1] we described 11 adults with staphylococcal pneumonia. In 1 case spontaneous pneumothorax appeared three times during the disease. The patient was a 21-year-old man with severe bilateral pneumonia (*Staphylococcus aureus* coagulase-positive, phage-type 80/52/52A). He was treated with various antibiotics and cortisone. On all three occasions prominent subjective signs, fever, and raised erythrocyte sedimentation-rate were present despite steroid therapy.

Medical Department B, "Asaf Harofe" Hospital, Zerifin, Israel. W. PRUZANSKI.

STERILISATION

SIR,—Many dressings, instruments, syringes, needles, and catheters used in operating-theatres and wards are now bought from the manufacturers ready packed and sterilised. There seems no doubt that the methods employed for sterilisation—i.e., gamma rays, ethylene-oxide gas, or live steam—are efficient, and that unless maltreated the wrappings will protect against contamination more or less indefinitely.

Before use the outer wrapping of paper 'Cellophane', or nylon has to be broken by cutting or tearing, and there is a danger that organisms on the outside of the package may reach its interior, or alternatively contaminate the article as it is withdrawn through the opening. When there is a second inner protective wrapping, the risk though much reduced may still be present. This inner wrapping is generally sealed as tightly as the outer, and usually requires cutting with scissors. If each layer were cut with a separate pair of sterile scissors there would be little danger; but we doubt whether this precaution is ever taken.

Some will object that it is possible to remove articles from such packages and they can be shown to remain sterile. We know that this is possible in a well-appointed laboratory; but it is less certain that it can be done under ordinary conditions, or by someone comparatively unskilled or working under stress or in a hurry.

Another objection might be that the danger of contamination is largely theoretical. With this we cannot agree. The outer coating of packaged goods may be exposed to hospital organisms for long periods, and may be handled by the heavily contaminated hands of carriers of *Staphylococcus aureus*.

Factory-packed and sterilised articles possess so many advantages that their widespread use is to be encouraged; but we suggest that more thought be given to improving packaging methods. If only one wrapping is used, it should be possible to open the package without tearing or cutting, and in such a way that the contents can be taken out without coming in contact with any contaminated part of the wrapping. Whenever possible there should be two wrappings, the inner so devised that it protects the contents during the opening of the outer, but does not need tearing or cutting before its contents can be withdrawn.

May we repeat that we do not wish to imply that the methods of sterilising adopted by manufacturers are at fault, or that it is impossible to extract sterilised articles from their package without contaminating them. But we do suggest that for ordinary everyday use in hospital and in general practice, many of the packaging techniques now employed should be improved.

St. Thomas's Hospital, London, S.E.1. RONALD HARE.
Guy's Hospital, London, S.E.1. P. J. HELLIWELL.
St. Bartholomew's Hospital, London, E.C.1. R. A. SHOOTER.

CARE OF THE INJURED

SIR,—Let us not lose our sense of proportion. Things have changed since 1939. To give a specific instance:

In 1939 at The West Middlesex Hospital there was no department of traumatic and orthopædic surgery; trauma was dealt with by the general surgeons of whom, apart from junior staff, there were 2. A visiting orthopædic surgeon attended 2 sessions a week, but his work was confined to orthopædics and he was not available for emergencies. There was 1 casualty officer, no shortage of beds or of nurses, and all cases seeking admission were admitted. Now—apart from increases in the rest of the surgical staff and excluding junior staff—there is a traumatic and orthopædic unit which also is responsible for casualty; a senior staff of 3 consultants, 2 carrying out maximum part-time sessions at the hospital and the 3rd, on the staff also of another hospital in the group, having 3 sessions in casualty. There are 4 casualty officers and a casualty registrar; and there is a rehabilitation unit under the care of the director of physical medicine. A 24-hour service is provided and apart from some patients with head injuries, who are transferred to a neuro-surgical unit, the hospital treats all injuries. There is also a part-time registrar doing research.

This change is not unique. Similar facilities are available at the neighbouring general hospitals; and such changes have presumably occurred at most of the former municipal and county and larger voluntary hospitals. One has only to look at the addresses of the members of the British Orthopædic Association to see how wide is the geographical spread of these specialists. Here let us praise those much abused gentlemen—the administrators—and in particular the senior administrative medical officers of the regional boards who have been largely responsible for these improvements.

Our difficulties arise, not so much from defective buildings—deplorable as many are—as from the shortage of beds due to shortage of nurses, and from the variation in the quality and numbers of junior staff, and particularly of casualty officers.

Is the treatment of the injured in this country really so bad? Does the treatment of the injured in this country compare so badly with that in Europe and America? Being near London Airport we see a sample of Continental treatment and are not impressed. But we do not have to rely on opinions, no matter how distinguished. No branch of medicine is subject to such continuous inspection, both clinical and administrative. All fatal accidents, including accidents at home, have to be reported to the coroner. A very large proportion of industrial and of traffic accidents involve litigation, and the patients are examined by independent medical assessors (usually highly experienced) for the insurance companies. Industrial accidents lead to a medical tribunal examining the patient; and nearly every mistake made by a casualty officer is reported to and investigated by his hospital authority if not by other bodies. There is thus available a mass of factual material on which a sound judgment could be based, not only of the overall efficiency of treatment, but of those hospitals whose standards are low. The medical officers of the insurance companies could give most illuminating evidence; but it would have to be privileged.

1. Pruzanski, W., Altman, R. *Harefuah*, 1960, **58**, 11.

No doubt there are black spots; but do we really need "central, self-contained accident units"? What precisely is involved in "coordinating the accident services of the area"? Are we to have in effect separate accident hospitals, discrete, but attached—like a flirtation—to a general or even a teaching hospital? And "coordination"! Does this magic vocable imply that the peripheral hospitals will get directives as to what they may and may not do? Are the patients and their relatives to travel miles to and from their homes; and where are the additional ambulance drivers to come from? This service is overloaded as it is, and with no relief in sight.

But larger issues of hospital policy are involved. The hospital plant of this country is obsolete. The buildings are old, inconvenient, inadequate, and often badly sited in relation to present need. At long last we are promised a modest rebuilding programme; but the real resources available—i.e. medical man-power, nurses, and new buildings—are limited. Surely the right policy is to build new hospitals of the appropriate size—say, 400–900 beds—which will serve a manageable area (transport being the limiting factor) and in which the accident and orthopædic unit will be a part of the traditional general hospital. This is the solution most economical of scarce resources, and moreover, the one most efficient in treating patients suffering from disease or injury. It is curious that at a time when most competent opinion favours bringing into the general hospital those two branches of medicine—i.e., mental and infectious disease—hitherto separated, some should advocate what is in effect a divorce of the accident services. Far more to the point would be to press for effective preventive measures to deal with that modern epidemic—traffic accidents. Fevers were not conquered by building fever hospitals, but by prophylaxis. Why not preserve that well-tried institution, the general hospital? It has survived the brutal but effective test of experience.

Important as buildings are, men are more important. In the non-teaching hospitals where most of the hospital work is done, there are serious difficulties in staffing, not only casualty but other departments, especially where junior posts are concerned. A proper career structure, somewhat different from that of the teaching hospital is needed. The Platt report suggests that this need has been recognised.

Even more serious is the nursing shortage. 183 beds have been closed in Leicestershire because of this; and at the West Middlesex Hospital alone 160 beds are closed for the same reason. These are not isolated instances. Unless this shortage can be remedied it will defeat all our efforts to improve the hospital service. Far more effort in future should be devoted to its cure by medical, nursing, and administrative staffs.

West Middlesex Hospital, Isleworth. E. A. DEVENISH.

IDIOPATHIC APLASTIC ANÆMIA

SIR,—The most interesting point in the article by Dr. Israëls and Dr. Wilkinson (Jan. 14) seemed to me to be the use of blood from polycythæmic patients for transfusion in their series. I presume that by polycythæmia the authors mean polycythæmia rubra vera in which periodic blood-letting is one of the recognised forms of treatment.

In many centres in Britain, as far as I know, the blood from such patients is never used for transfusion; and I have seen bottles of this blood being thrown away. Various reasons are put forward for not transfusing such blood—the most important being the hypothetical possibility of transmitting the disease to the recipient.

I would be interested to know if the authors transfused blood from polycythæmic patients into all types of patients or only into those in this series; for the state of the bone-marrow in idiopathic aplastic anæmia seems to be just the reverse of that in polycythæmia vera; and also whether other centres also tranfuse this blood.

Victoria Hospital, Darjeeling, India. B. K. ROY.

MAURITIUS AND MALTHUS

SIR,—Mr. Baker (March 25) is surely not being entirely logical in disagreeing with the conclusion in your leader that "family planning seems the only answer" for Mauritius, in that he argues from the general to the particular.

Mauritius has an urgent basic problem—overpopulation—with 900 people to the square mile in an almost entirely agricultural island, much of which is forested or mountainous.

Undoubtedly improved education, agriculture, and transport would enable the world to support a large population, but these are not the problems of Mauritius, where people with the general certificate of education can be found in quite menial jobs; where the agricultural potentialities are very efficiently exploited; and where an excellent system of roads allows ready access to almost any part of the island. Effort, money, and time have already been expended in abundance in the way suggested by Mr. Baker, but the pressure of overpopulation is becoming rapidly worse.

Mauritius cannot properly support 600,000 people and there is consequently much unemployment and malnutrition. Surely the cost of introducing family planning to such a community would not be "immense", and the conclusion reached by Titmuss, Meade, and their associates seems rational. There is, of course, a considerable amount of opposition in the island itself to the introduction of such a scheme.

London, N.10. ALAN WADE.

"MONGOLISM"

SIR,—It has long been recognised that the terms "mongolian idiocy", "mongolism", "mongoloid", &c., as applied to a specific type of mental deficiency, have misleading connotations. The occurrence of this anomaly among Europeans and their descendants is not related to the segregation of genes derived from Asians; its appearance among members of Asian populations suggests such ambiguous designations as "mongol Mongoloid"; and the increasing participation of Chinese and Japanese investigators in the study of the condition imposes on them the use of an embarrassing term. We urge, therefore, that the expressions which imply a racial aspect of the condition be no longer used.

Some of the undersigned are inclined to replace the term "mongolism" by such designations as "Langdon-Down anomaly", or "Down's syndrome or anomaly" or "congenital acromicria". Several others believe that this is an appropriate time to introduce the term "trisomy 21 anomaly" which would include cases of simple trisomy as well as translocations. It is hoped that agreement on a specific phrase will soon crystallise if once the term "mongolism" has been abandoned.

GORDON ALLEN, Bethesda, Maryland.
C. E. BENDA, Waverly, Massachusetts.
J. A. BÖÖK, Uppsala, Sweden.
C. O. CARTER, London, England.
C. E. FORD, Harwell, England.
E. H. Y. CHU, Oak Ridge, Tennessee.
E. HANHART, Ancona, Switzerland.
GEORGE JERVIS, Letchworth Village, New York.
W. LANGDON-DOWN, Normansfield, England.
J. LEJEUNE, Paris, France.
HIDEO NISHIMURA, Kyoto, Japan.
J. OSTER, Randers, Denmark.
L. S. PENROSE, London, England.
P. E. POLANI, London, England.
EDITH L. POTTER, Chicago, Illinois.
CURT STERN, Berkeley, California.
R. TURPIN, Paris, France.
J. WARKANY, Cincinnati, Ohio.
HERMAN YANNET, Southberry, Connecticut.

ROLE OF THE ERYTHROPOIETIC HORMONE

SIR,—The comments of Dr. Payne and Dr. Jones in their letter (March 4) are most welcome. Great confusion has arisen through the use of such varied assay procedures for the erythropoietic hormone, and it is important that the situation should be clarified.

Polycythæmia associated with renal lesions was discussed in my article [1] only in so far as the study of such cases has shed light on the *physiological* regulation of the bone-marrow. The point at issue was not the *statistical* significance of the association, although even here interesting points emerge. Considerable attention has been paid to the *pure red-cell* polycythæmia which may accompany renal lesions, but of the 21 cases reviewed by Lawrence and Donald [2] (quoted by Dr. Payne and Dr. Jones), 6 were noted to have splenomegaly, and a further 7 had elevated white-cell or platelet-counts, features usually associated with polycythæmia vera. (These features are not shared by the "physiological" polycythæmia secondary to anoxia [altitude, cardiac, or respiratory]. None the less an association of polycythæmia vera with renal lesions would be of considerable intrinsic interest.) Erythræmia may also accompany cerebellar hæmangioblastomas,[3 4] hepatomas,[5] and uterine fibromas,[6 7] remitting when the primary tumour is removed. Korst et al.[8] reported plasma-erythropoietic activity, assayed by the starved-rat technique, in a patient with a cerebral tumour and polycythæmia; and although I do not dispute that many types of assay procedure, including Dr. Payne's, will respond to stimulation by the erythropoietic hormone, the crux of the matter is *specificity*, for other factors also influence these assays. "All that glisters is not gold."

Hæmolysis of the cells of one species by the serum of another has been known since the early days of blood-transfusion.[9] Human plasma agglutinates rat red cells in vitro, and the degree of hæmolysis in vivo varies, in our experience, from sample to sample. Apparent stimulation of erythropoiesis by whole plasma cannot be accepted as indicating a specific humoral effect unless hæmolysis is excluded in each sample assayed.

When the reticulocyte-count in normal animals is used for assay, the problem of the "lipid" factor of Linman et al.[10] arises. This has been considered in some detail in my earlier letter.[11] It differs from the erythropoietic hormone both chemically, being lipid rather than mucoprotein or polypeptide in nature, and in its effect on erythropoiesis: for it produces reticulocytosis and abnormal microcytic red cells, with short survival, and does not affect hæm synthesis.[12] A mucoprotein fraction obtained from plasma [13–15] and urine [15 16] stimulates both hæmoglobin and red-cell production, leading to polycythæmia with increase in red-cell mass,[16] *in addition to reticulocytosis*.[17] This fulfils the requirements of a physiological regulator of red-cell production. We found that *ether-insoluble* plasma fractions stimulated *both* hæm synthesis and reticulocytosis in normal and in polycythæmic animals; and we also confirmed that a mucoprotein fraction, free of any lipid factor, will produce reticulocytosis. It is important to know whether the "lipid" factor *results from* or is the *primary cause* of marrow proliferation, as it has been claimed that this factor in plasma in polycythæmia vera and secondary polycythæmia [18] indicates that *both* conditions are due to overstimulation of the bone-marrow by the physiological hormone. (The view that it was not produced by the marrow [19] was based largely on studies assuming that only the lipid factor was capable of producing reticulocytosis. An alternative explanation of the findings of Linman et al.[19] in polycythæmia vera has already been presented.[11]

Our own preliminary findings are as shown in the accompanying table. Only in polycythæmia secondary to respiratory anoxia was convincing erythropoietic activity observed in the plasma, despite the fact that several of the primary cases had severe, progressive polycythæmia which had failed to respond to previous ^{32}P therapy. In one patient with polycythæmia vera (case 3) there was a suggestion of "activity"; but the failure to concentrate this by an extraction procedure [1] which concentrates activity in anæmia and respiratory anoxia suggests that it is *not* due to the *physiological* hormone. The chemical basis and biological significance of this apparent slight stimulation is of great interest. Paschkis et al.[20] showed that liver regeneration stimulated tumour growth in parabiotic rats, and that increased growth in a number of tissues accompanied liver regeneration after partial hepatectomy.[21] Millar and Turner [22] found that urine fractions from patients with lymphatic reticuloses, and chronic lymphatic and myeloid leukæmia stimulate proliferation of lymphocytes and polymorphs respectively in recipient animals. These effects must all involve plasma "humoral" agents *resulting from* proliferation.

ASSAY OF ERYTHROPOIETIC HORMONE IN POLYCYTHÆMIA

—	Case no.	Total plasma dose (ml.)	Assay response (× standard deviation from mean control)*	No. of animals	Significance
A. Polycythæmia vera					
Whole plasma ..	1	4	+0·7	3	Nil
	2	6	+0·9	3	"
	3	4	+2·1	2	Doubtful
Plasma extract † ..	3	20	+2·3	4	$P<0.05$
	4	25	+1·4	4	Doubtful
B. "Respiratory" polycythæmia					
Whole plasma ..	5	4	+4·6	2	$P<0.01$
	6	4	+5·1	2	$P<0.01$
	6	4	+6·0	2	$P<0.01$
Plasma extract † .. (further sample)	7	25	+10	4	$P<0.01$

* Control iron utilisation at 24 hr.: 3·04% ± 1·06 (mean and standard deviation of 20 determinations).
† Heat-extraction method.[1]

I have had the opportunity to study a larger group of patients with polycythæmia vera, and erythræmia associated with respiratory anoxia with tumours (cerebellar hæmangioblastoma, hepatoma, and fibroids), and with renal lesions (nephritis and hydronephrosis). While the physiological hormone appears to be responsible for red-cell proliferation in respiratory disease, and most probably in some cases with hydronephrosis, our findings in polycythæmia vera and polycythæmia with tumours do not at present support the view that these are associated with increased secretion of the *physiological* hormone. The lipid factor is found in marrow proliferation, both physiological and pathological (polycythæmia vera), so that assays which respond to it do not, in my view, provide evidence of ætiological significance in cases such as that studied by Jones et al.[23]

Finally, may I deal briefly with the technical points raised by Dr. Payne and Dr. Jones. The blood-volume of the assay animals was 7·5 ml. ± 0·73 (mean and standard deviation of 80 determinations) and this error, together with any from variation in venous/body-hæmatocrit ratio contribute to

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4. Schmid, R., French, L. A. *Schweiz. med. Wschr.* 1955, **85**, 1274.
5. McFadzean, A. J. S., Todd, D., Tsang, K. C. *Blood*, 1958, **13**, 427.
6. Thomson, A. P., Marson, F. G. W. *Lancet*, 1953, ii, 759.
7. Horwitz, A., McKelway, W. P. *J. Amer. med. Ass.* 1955, **158**, 1360.
8. Korst, D. R., Whalley, B. E., Bethell, F. H. *J. Lab. clin. Med.* 1959, **54** 916.
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10. Linman, J. W., Bethell, F. H., Long, M. J. *J. Lab. clin. Med.* 1958, **51**, 8.
11. Penington, D. G. *Lancet*, 1960, i, 975.
12. Linman, J. W., Long, M. J. *Blood*, 1958, **13**, 226.
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14. White, W. F., Gurney, C. W., Goldwasser, E., Jacobson, L. O. *Rec. Progr. Hormone Res.* 1960, **16**, 219.
15. Hodgson, G., Periera, M., Yudilevich, D., Eskuchi, I. *Proc. Soc. exp. Biol., N.Y.* 1958, **99**, 137.
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17. Rambach, W. A., Alt, H. L., Cooper, J. A. D. *Blood*, 1957, **12**, 1101.
18. Linman, J. W., Bethell, F. H. *J. Lab. clin. Med.* 1957, **49**, 113.
19. Linman, J. W., Bethell, F. H., Long, M. J. *Ann. intern. Med.* 1959, **51**, 1003.
20. Paschkis, K. E., Cantarow, A., Stasney, J., Hobbs, J. H. *Cancer Res.* 1955, **15**, 582.
21. Paschkis, K. E., Goddard, J., Cantarow, A., Adibi, S. *Proc. Soc. exp. Biol., N.Y.* 1959, **101**, 184.
22. Millar, F. R., Turner, D. L. *Amer. J. med. Sci.* 1943, **206**, 146.
23. Jones, N. F., Payne, R. W., Hyde, R. D., Price, T. M. L. *Lancet*, 1960, i, 299.

the stated scatter of observations. The tests for significance apply to results including these errors. With ^{59}Fe autoradiographs we have found no significant difference in grain-counts over normoblasts in "control" and "stimulated" animals, although the proportion of normoblasts present is greatly reduced in the former. Reticulocytes do, of course, contribute to the iron utilisation, particularly if we take the 24-hour value, but as the reticulocyte-count in "unstimulated" polycythæmic animals is of the order of 0·03%, factors stimulating hæm synthesis *alone* will not give rise to false-positive results.

The London Hospital, London, E.1. D. G. PENINGTON.

NEUROLOGICAL COMPLICATIONS OF INFLUENZA

SIR,—The recent influenza epidemic here, affecting especially the elderly, provided a forceful reminder of the many neurological complications in this disease.[1]

In descending order of incidence, these were:

(1) Brain-stem involvement with dysphagia, vomiting, &c.

(2) Encephalitis with headache, photophobia, giddiness, vomiting, &c.

(3) Encephalomyelitis.

(4) Autonomic neuropathy with diarrhœa, vomiting, and tachycardia.

(5) Polyneuritis.

City Hospital, Chester. T. K. BOSE.

OXYTETRACYCLINE PROPHYLAXIS IN CHRONIC BRONCHITIS

SIR,—From October, 1958, to March, 1959, 59 men with severe chronic bronchitis were admitted to hospital with acute respiratory illnesses.

When they left, 32 men selected at random were each given 20 tablets (0·5 g.) of oxytetracycline and the following instructions: "If you have a severe head cold, or the phlegm becomes yellow or green, or you feel that you are beginning with a chest illness, take 1 tablet after breakfast, dinner, tea, and supper." Further tablets were given if necessary.

Before the trial ended in March, 1960, 20 of these patients had taken 36 courses of oxytetracycline, which prevented serious respiratory illnesses in 15. 5 men were readmitted, 2 because of bronchospasm, and 3 with reinfection; 1 of the latter had failed to follow the instructions. None of the trial patients died. 7 of the 27 controls were readmitted to this hospital, and 2 died; 6 other control patients died during the trial period.

These results are encouraging, and we prefer this method to the continuous administration of antibiotics.[2,3]

Whiston Hospital, Prescot, Lancashire. E. SHERWOOD JONES
J. E. FORSTER.
Pfizer Ltd., Folkestone, Kent. J. K. MORRISON.

TREATMENT OF RECENT BELL'S PALSY BY CERVICAL SYMPATHETIC BLOCK

SIR,—The treatment of the complete type of Bell's palsy by cervical sympathetic block recently reported by Mr. Boyes Korkis (Feb. 4) has made a great difference to the work of physical medicine departments. Before, such cases could be divided into those which recovered within three to four weeks of onset, and those in which recovery was extremely slow and which finally were left with weakness, contractures, or overaction, after three years of physiotherapy.

With sympathetic block, most recent cases (93%) can now be placed in the first category, with immediate or nearly immediate recovery; and no call is made upon the physiotherapy services.

Facial palsy is now rarely seen in the physical medicine department. Only late and complicated cases (thrombotic, arteriosclerotic, infective, post-traumatic, and those with geniculate herpes) are encountered.

Very nearly all cases of facial palsy appear to be of the vasospastic type (true Bell's palsy); and by early and rapid relief of angiospasm facial nerve function can be completely restored without physiotherapy.

Hillingdon Hospital, Hillingdon, Middlesex. R. J. TALBOT.

BEHAVIOUR THERAPY IN TRANSVESTISM

SIR,—In their interesting letters, Dr. Barker and his colleagues (March 4) and Dr. Glynn and Dr. Harper (March 18) describe the apparently successful treatment of transvestism by aversion therapy using apomorphine injections. I should like to point out that the treatment of cases of transvestism along these lines may not always be so straightforward.

Experience of the apparent cure by this treatment of rubber-clothing fetishism (follow-up fifteen months and six months) led me to apply similar treatment recently to a 37-year-old fetishist, whose practices dated from early childhood. Apomorphine injections two-hourly, combined with dressing up in female clothing, were used day and night for five days, with pilocarpine nitrate in addition when the effects of the apomorphine began to wane.

In the course of treatment, the patient, unlike the fetishists, failed to show aggression or refusal to don the clothes, and previously underestimated masochistic traits became evident. This treatment was carried out in the week before the letter of Dr. Barker and his colleagues. It is not yet certain whether, like the two fetishists, this man will have become indifferent to the clothing, but, since the time of treatment, he has remained in a condition of severe agitation and depression, with suicidal thoughts.

Department of Psychological Medicine, University of Edinburgh. IAN OSWALD.

SKELETAL FLUOROSIS

SIR,—In reply to Dr. Alcock's letter (March 11) I would like to comment on dental fluorosis, and on the safety and desirability of adding sodium fluoride to public water-supplies.

In my original letter (Feb. 18) I did not say that I was confining my remarks on dental fluorosis to the situation in temperate climates, since the proposal to fluoridate water is a matter which may affect people in all climates.

Galagan and Lamson [1] show quite clearly that at concentrations of less than 1 part per million (p.p.m.) objectionable mottling occurs in the hot zone (temp. 69·3°F) and less objectionable mottling in the temperate zone (temp. 50·6°F). The more objectionable mottling, as the authors suggest, is probably related to the increased water consumption and the fact that the preparation of the dietary staple (beans) could concentrate the fluorides. Since the question of temperature has been raised, readers may like to know that marked dental mottling can occur with low concentrations of fluorine in water in this country. Kemp et al.[2] describe severe dental fluorosis in two villages in Oxfordshire where the water-supplies contained 0·8 p.p.m. and 0·3–1·2 p.p.m. respectively. Forrest [3] describes objectionable mottling in Essex and Surrey where the fluorine content is 0·1–0·2 p.p.m., but regards this as a developmental hypoplasia. Despite the assurance of the W.H.O. report [4] that 1·0–1·5 p.p.m. will cause only slight flecking of the enamel, it has been estimated that more than 200,000 children in the U.S.A. have already become victims of definite life-time mottling since artificial

1. Leigh, A. D. *Brit. med. J.* 1946, ii, 936.
2. Edwards, G., Fear, E. C. *Brit. med. J.* 1958, ii, 1010.
3. Murdoch, J. M., Leckie, W. J. H., Downie, J., Swain, R. H. A., Gould, J. C. *ibid.* 1959, ii, 1277.

1. Galagan, D. J., Lamson, G. G., Jr. *Publ. Hlth Rep., Wash.* 1953, **68**, 497.
2. Kemp, F. H., Murray, M. M., Wilson, D. C. *Lancet*, 1942, ii, 93.
3. Forrest, J. R. *Roy. Soc. Hlth J.* 1957, **77**, 349.
4. *World Health Organisation Technical Report Series*, 1958, no. 146; p. 5.

fluoridation of water was introduced. Dental fluorosis now has the highest incidence of any waterborne disease in the United States. Can we wonder that not only are fewer cities taking on fluoridation, but also many with fluoridation programmes are dropping them.[5]

In my second letter (March 4) on safety and desirability I wrote ". . . there has been no adequate scientific inquiry which proves that such a measure is either desirable or safe". This is not my isolated view as Dr. Alcock suggests; it is also the opinion of a great many serious thinkers in the medical, dental, and other professions. The following five extracts are a few of the many adverse comments appearing after the W.H.O. report of 1958.

(1) "The sound basis on which the efficacy of a public-health measure must be assessed is not provided by these five crucial trials." [6]

(2) "The propaganda in favour of primitive and scientifically unconvincing work must be viewed with great suspicion." [7]

(3) "After 15 years of zealous promotion it is obvious that the original claims and promises of reduction in dental decay were not soundly based and grossly overrated any reasonably anticipated benefit. Such claims as 65% reduction in dental decay remain slogans without convincing scientific support." [5]

(4) The Association of American Physicians and Surgeons "condemn the addition of any substance to public water-supplies for the purpose of affecting the bodies or bodily or mental functions of the consumers".[8]

(5) "The onus of proving that fluoridation is beneficial to teeth rests upon those who assert it, and so does the onus of proving that the continuous ingestion of fluorides involves no risk of accumulative toxicity. This onus of proof has not been satisfactorily discharged. Even if it were, the only conclusion to be drawn would be that it is permissible for doctors who believe in the efficacy of fluorides to prescribe them. But no conclusion could be drawn that it is right to force fluorides upon a whole population via their public water-supplies, for that raises a fundamental question of human rights upon which no doctor or dentist is entitled to adjudicate." [9]

We must remember that fluorine is the most active element known [10] and is a powerful oxidising agent. It is also a potent enzyme poison and Prof. Hugo Theorell (awarded the Nobel prize for his work on oxidative enzymes) bases his objection to fluoridation on this point. Fluoride, like cyanide, can form a spectroscopically recognisable compound with the enzyme catalase which inhibits it.[11] Catalase plays a vital role in cell respiration and its inhibition is known to be linked with cancer, mutation, the creation of viruses, and the activity of hormones, &c.

No, Sir, the case so far presented for artificially fluoridating drinking-water for human consumption is not ethical, safe, scientific, or desirable.

Sir Wilfred Fish [12] has pointed out that dental caries is a disease which is (1) unknown in communities to which civilisation has not spread and (2) linked with the civilised diet. Professor MacGregor [13] and a recent leader in the *British Medical Journal* [14] support the second point, and all three articles agree that it is widely accepted that this condition can be largely prevented by dietary means. We in Britain with such a high incidence of dental decay have a golden opportunity to set an example to the rest of the civilised world by dealing with the major cause—a sophisticated and chemically adulterated food-supply. This is not an impossible or impracticable task.

Institute of Pathology,
The Royal Infirmary,
Cardiff.

R. A. HOLMAN.

5. Medical-Dental Committee on Evaluation of Fluoridation. Report. New York City, 1960.
6. Sutton, P. R. N. Fluoridation: Errors and Omissions in Experimental Trials. Melbourne, 1959.
7. Polya, J. B. *Proc. R. Aust. chem. Inst.*; 1960 **27**, p. 354.
8. Canadian Intelligence Service, 1959, **9**, no. 8; 4. (Canadian Intelligence Publications Ltd., Ontario.)
9. Douglas of Barloch. Edmonton Pure Water Association, March 1, 1960. (P.O. box 624, Edmonton, Alberta).
10. Partington, J. R. General Inorganic Chemistry; p. 766. London, 1958.
11. Baldwin, E. Dynamic Aspects of Biochemistry; p. 158. London, 1957.
12. Fish, W. *Roy. Soc. Hlth J.* 1957, **77**, 340.
13. MacGregor, A. L. *New Scientist*, 1959, **5**, 451.
14. *British Medical Journal*, 1961, i, 262.

Parliament

Progress of N.H.S. Legislation

IN contrast with its protracted progress through the House of Commons, where it received a third reading on March 16, the National Health Service Contributions Bill went through all its legislative stages in the House of Lords on March 27 in about an hour. The Bill received the Royal Assent on March 28. Under an order announced by the Treasury, July 3 has been appointed as the day from which the increased contributions will come into effect.

The National Health Service Bill, which makes further provision for charges for the dental and optical services, was read a third time in the House of Commons on March 29 and a first time in the House of Lords on March 30. Winding up the debate on the third reading in the Commons, Mr. ENOCH POWELL said that, according to the original estimate, the gross expenditure on the N.H.S. would be £886 million, a figure which represented a higher proportion of the national income than had ever been applied in this country to health services. The net figure, which was the Exchequer contribution, controlled the extent to which we were able to expand the service. It expanded by 6½% the year before last; by 8½% last year. Next year, even after all these charges, it would still be up by a further 3%. Given that there was a limit—and inevitably there must be a limit to the net cost of the service—the extent to which we could go forward in its expansion depended on the sources of finance which we could obtain from elsewhere, and he challenged any hon. Member to say that it was more important that the sum of £65 million which emerged from all the new charges, should be devoted to maintaining the *status quo* rather than to carrying forward the expansion of the service.

QUESTION TIME

Urgent Operations for Children

Dr. DONALD JOHNSON asked the Minister of Health what guidance he was giving to hospital management committees in regard to the initiation of procedures leading to the establishment of special children's courts in hospitals in cases where the parents of children have refused their consent to urgent operations.—Mr. POWELL replied: I have advised hospital authorities not to resort to the "care or protection" procedure, but to rely on the clinical judgment of the consultants concerned after full discussion with the parents.

Industrial Accidents

During 1960 there were 12,651 industrial accidents affecting young workers. This is an increase of 1650 (or 15%) over the figure for 1959.

Appointments

DAVIE, R. D. M., M.B. Edin., F.F.A. R.C.S.: consultant anæsthetist, county and city of Perth general hospitals group.
HOSKING, D. J., M.B. Lond., D.P.H.: senior assistant M.O., Nottingham.
MCLEOD, NORMAN, M.B. St. And., F.F.A. R.C.S.: consultant anæsthetist, county and city of Perth general hospitals group.
MCNAMARA, HILDA E., M.D. Toronto, D.OBST., D.P.H.: maternal and child welfare M.O., Derbyshire.

Birmingham Regional Hospital Board:

BILLINGTON, J. G., M.A. Cantab., M.R.C.S.: S.H.M.O. in geriatrics, Summerfield Hospital, Birmingham.
LIU, MEI-CHEN, M.D. Cheeloo, D.P.M.: consultant psychiatrist, Monyhull Hospital, Birmingham.
SAGE, R. H., M.B. Birm., F.R.C.S.: consultant surgeon, Selly Oak Hospital, Birmingham.
ZOLLMAN, LEO, M.D. Prague, D.P.M.: consultant psychiatrist, Barnsley Hall Hospital, Bromsgrove.

Obituary

EVELYN DAVISON TELFORD

M.A., B.Chir. Cantab., M.Sc. Manc., F.R.C.S.

Prof. E. D. Telford, consulting surgeon to Manchester Royal Infirmary, died at his home at Prestatyn on March 26, at the age of 84.

He claimed he was a Yorkshireman, but only just, for Middlesbrough, where he was born, is little short of the Durham border. The building of the Liverpool Overhead Railway brought his father to Lancashire when he was 10, and he was educated at the Manchester Grammar School, winning an exhibition, later converted into a scholarship, at Caius College, Cambridge. There he won prizes and obtained a first in the natural sciences tripos. He returned to Manchester for his clinical work at a time of great surgical interest. A fellow Mancunian describes the period thus:

> "The first operation for acute appendicitis, the first closure of a perforated gastric ulcer, and the first gastro-enterostomy marked the hesitant fumbling change from antiseptic to aseptic technique. The leading textbook on surgery cost 7*s*. 6*d*. In those days the term 'dresser' meant much more than it does today. Dressers worked from 9 a.m. to noon washing out bladders, dressing colostomies, and irrigating gaping cavities adorned by batteries of drainage tubes. If a man was missing from the team he heard about it in no uncertain manner."

Perhaps partly thanks to this stringent training, when Telford qualified in 1899 he was head of the list in the final examination at Cambridge. After holding the usual sequence of hospital appointments he took the F.R.C.S. in 1903, and he was appointed surgeon to the Children's Hospital at Pendlebury in 1905, and assistant surgeon at Salford Royal Hospital in 1906. He joined the surgical staff of the Manchester Royal Infirmary in 1908. He was appointed to the chair of systematic surgery in 1922. He retired in 1936, but returned to work during the war years.

W. B. writes:

"Telford was essentially a first-class, but conservative, general surgeon, in some ways of the old school, in others surprisingly modern. He had a simple straightforward technique that avoided unnecessary cutting. He took great interest in children. It was an experience for his students to visit the wards at Swinton House Residential School to see something of his immensely valuable work. Keen students on his unit were used as dressers, a privilege which happened nowhere else. His teaching was superb. He lectured without a note, standing in front of the lecturer's desk and leaning against it. His hour's lecture invariably finished in forty minutes and was a clear concise exposition of the subject. Some surgeons thought he oversimplified, but his words remained in the memory. He had a great sense of obligation to his young men. Where other chiefs contented themselves with testimonials Telford spoke behind the scenes with the result that his men got jobs and this was recognised by them and others.

"He made important contributions to surgery, many in close collaboration with Stopford, then professor of anatomy. They published papers on thromboangiitis obliterans and its treatment by sympathectomy (of which Telford was a pioneer) and on the prognostic value of spinal anæsthesia in vasospastic disease of the lower limbs. When he retired the Infirmary lost one of its best and most punctual surgeons, finest lecturers, and most respected personalities. He was called back for the war years and published a notable paper on the thoracic inlet syndrome.

"He was an authority on mezzotints and had a remarkable and valuable collection of early English water-colours. As a gardener he specialised in auriculas. These and walking were his hobbies. He and his wife knew well the Yorkshire dales, the hills of Derbyshire, and the mountains of North Wales, and it was to Wales that he retired."

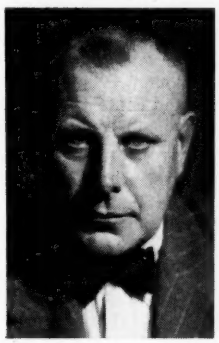
His wife survives him.

HAMILTON BAILEY

F.R.C.S., F.A.C.S.

Hamilton Bailey's name is one of the best known of his surgical generation, for his textbooks had been translated into six languages and were read and studied all over the world. Though illness ended his career as an active surgeon some years ago, he continued with his writing and editing, and up-to-date editions of his works continued to appear regularly. He died on March 26 at his house at Malaga, where of late he always spent the winter months. He was 66 years of age.

His father was a doctor in Brighton, and he was educated at St. Lawrence College, Ramsgate, and the London Hospital. As a medical student he joined the first Belgian unit of the British Red Cross at the beginning of the 1914–18 war. He was taken prisoner, but was repatriated. After qualifying in 1916 he served in the Royal Navy as a surgeon lieutenant in H.M.S. *Inflexible* and *Monitor 19*.



Fayer

After the war he took the F.R.C.S. in 1920 and held surgical registrarships at the London Hospital and at Liverpool Royal Infirmary, where he was later appointed to the honorary staff. He was anxious to gain wider surgical experience, and he resigned from his Liverpool appointment in 1927 to become resident surgeon at the Dudley Road Hospital, Birmingham. During his two years there he became particularly interested in emergency surgery. In 1931 he moved to Bristol where he was surgeon to the Bruce Wills Memorial Hospital.

In 1932 he returned to London and joined the honorary staff of the Royal Northern Hospital. He also held appointments at the Metropolitan Ear, Nose, and Throat Hospital, and the Italian Hospital. Though he was disappointed never to join the staff of one of the teaching hospitals, he and his colleagues made the Royal Northern a postgraduate centre for surgeons from all over the Commonwealth. His writings were an effective complement to his teaching. His first book *Physical Signs in Clinical Surgery* was published in 1927 while he was still at Birmingham. Mr. McNeill Love, his colleague at the Royal Northern, was his collaborator in a *Short Practice of Surgery*. Several editions of his *Surgery of Modern Warfare* appeared despite war-time difficulties, and an entire one was bought for distribution to American medical officers.

A. S., paying tribute to Hamilton Bailey's work as an author and teacher, writes:

"His success was earned by unremitting, well-directed, and highly organised toil. This was a dedicated man. John Hunter himself could not have bettered the wholeheartedness with which Hamilton Bailey devoted his tremendous energy and his talent to his profession. Besides his active surgical practice, which was prodigious in itself, secretaries, dictaphones, telephone-recorders, collecting clinical photographs and case-records, travelling, lecturing, and above all writing, teaching, and more writing filled the remainder of his time. His work pursued him even on to the golf course from which he could be, and nearly always was, summoned by a signal from the club-house. It is said that he virtually pursued his work—writing at a mobile desk which circulated in front of him.

"He was a pure mesomorph—a sort of Hercules of surgery to whom no task seemed impossible when knowledge and energy were in harness together. No failure could daunt him

and he remained optimistic and forward-looking to the end. To his house-surgeons he could seem difficult, at times unreasonably so—in our youthful and impossibly demanding judgment the man sometimes fell short of the legend. As we came to know him and the world better, we could not but admire his selflessness, his integrity, and his generosity.

"From his first articles in the surgical press written when he was first assistant at the London Hospital his writings were masterpieces of thoroughness in preparation and production. When his books began to appear, it was apparent that here was something new in medical journalism. In intent, as well as in personality, there was something of Northcliffe in Hamilton Bailey. His aim was a wider public and he reached it. What made his books successful were conciseness, accuracy, and the carefully hunted and perfectly chosen illustrations, many of which are as vivid in the minds of graduates throughout the world as patients seen and treated by themselves.

"Perhaps he did not reach the heights that his youthful and boundless ambition had marked out, but his influence was vast and entirely for the good; he enriched his hospital by his service and countless graduates and students by his lucidity and honesty."

In 1925 Mr. Hamilton Bailey married Miss Veta Gillender, who survives him. Their only son was killed in a railway accident in 1944.

ARTHUR HUNTON CARTER

M.D. Lond.

Dr. A. H. Carter, who died at his home in Sedbergh, Yorkshire, on Feb. 5, at the age of 89, was for nearly forty years a well-known physician and practitioner of Wolverhampton, but he will also be remembered as the school doctor at Sedbergh.

He was born at Richmond in Yorkshire, the son of another doctor. He was educated at Aysgarth and Sedbergh and qualified from Guy's Hospital in 1899. While he was house-physician at Guy's, the Boer War broke out and he served as a medical officer with the Imperial Yeomanry. Soon after his return to England he settled in practice at Wolverhampton, where he soon was elected an honorary physician to the General Hospital. As time went on he built up a great reputation for many miles around Wolverhampton as a consulting physician.

When his colleagues and patients heard of his decision to retire, they may have visualised his spending the rest of his days pottering about his garden or walking the Yorkshire moors. But that was not Dr. Carter's idea of retirement. After a professional life which would have been full and complete enough in itself for most people, he became school doctor to his old school, Sedbergh—a post which he held for nearly twenty years. A full-time post of this kind was at that time unusual in the public-school world, and he set himself from the start to build up a tradition for such an appointment and how to fill it. E. H., who was the general surgeon to Sedbergh for many years and saw much of Dr. Carter's work, writes:

"From the very beginning he made it his practice to know every boy in the school from the time he first entered to the time he left, and not only to know his medical history but all about the boy—whether he was nervous or courageous, intellectual or indifferent, keen or lazy, and, when possible, the home atmosphere from where he came, and in his own quiet way Dr. Carter's influence pervaded the whole school wherever medical knowledge had a part to play in the work, games, and leisure of the school. He never seemed to be in any doubt as to the type of boy we were dealing with or whether the symptoms could be exaggerated somewhat, or, as was so often the case, played down, as was the customary Sedbergh habit, and at times a very dangerous one. Our respective diagnoses might not always have agreed, but as a rule it was mine which proved to be wrong, not his, so if in any doubt I learned to act on his diagnostic powers and not my own.

"Although he was not exactly young when he came to Sedbergh to take over the medical post, I never remember his turning in at night without looking in at the 'San' whenever he had any boys ill, or ever hesitating to turn out in the night, whatever the weather, and go over to a boy's house if called out by his house matron. I finally got quite accustomed to his telephone calls at night, presumably to ask my advice about a case, and then to hear his comment that that was just what he had thought and that the boy was already in an ambulance en route for hospital and he himself was getting ready to follow.

"Though a fine athlete himself, as were his own sons, likewise Sedberghians, he never worshipped at the altar of sport in spite of Sedbergh's great tradition in games, and no boy ever ran in the ten miles or played for the school unless they were superlatively fit on the day and strong enough to take no harm. Many of the Sedbergh boys, when they first met him, must have regarded him as cold and aloof and very much the reserved doctor, but, as they came to realise when they knew him better, in reality he was exceedingly kind and warm-hearted, thoughtful of their welfare, and nothing was ever too much trouble for their safety. No school could ever have had a wiser doctor or one who took more care of his boys."

Dr. Carter married in 1905 Winifred Macmeiken, who died some years ago. He leaves three sons and a daughter.

HOWARD C. NAFFZIGER

M.D., M.S., F.A.C.S., F.R.C.S.

THE death of Howard Naffziger in the United States so soon after that of Geoffrey Jefferson in this country takes from us within a few months another of the great leaders and exponents of neurosurgery. Aptly described as the Cushing of the Pacific coast, Naffziger was emeritus professor of surgery in the University of California and an outstanding figure in surgery in San Francisco, and few surgeons who passed through that lovely city would leave it without endeavouring to see him.

The frontal osteoplastic flap with its base in the temporal region, used almost universally for approaching the frontal lobe and the chiasmal and hypophyseal regions, and exposing such a lesion as a sphenoidal ridge meningioma, and having the advantage of avoiding conspicuous scars on the forehead, is known throughout the States as the Naffziger flap, though in this country we sometimes think of Wilfred Trotter in connection with it. Among Naffziger's other contributions to his subject are the operation of unroofing the orbit for decompression in cases of extreme degrees of exophthalmos, while outside the central nervous system his papers have chiefly applied to the scalenus and cervical rib syndromes and costo-clavicular compression.

Among his many well-deserved distinctions were the honorary fellowship of the Royal College of Surgeons of England which he was awarded in July, 1943, and the membership of many learned societies such as the Royal Society of Medicine and the Australasian and other societies of neurological surgeons.

He was a frequent visitor to this country, and during the war was one of the American neurosurgeons who with Loyal Davis and Glen Spurling visited the hospitals here for the American Forces and examined the facilities for neurosurgery.

Tall, well built, with iron grey hair, a steady gaze from rather prominent eyes, an attractive smile, and a charm of manner, Howard Naffziger's personality endeared him to all his friends, who will be saddened at the news of his death.

L. C. R.

Notes and News

WOLFSON SCHOOL OF NURSING, WESTMINSTER HOSPITAL

Queen Elizabeth the Queen Mother opened the Wolfson School of Nursing of Westminster Hospital on March 23.

The new school is the largest school of nursing specifically designed as such in this country. Its cost was covered by a grant of £250,000 from the Wolfson Foundation. There are 6 floors, including a partial basement. The roof is designed as a garden and recreation area. An assembly area on the ground floor can seat 500, and a smaller lecture theatre on the first floor, 116. On the other floors are demonstration wards, practice rooms, a science room, a practical anatomy classroom, a museum, and common-rooms for students and staff. The library, named after the late Countess Mountbatten, will have, besides medical works, books on non-medical subjects, bought with an additional gift from Mr. and Mrs. Wolfson.

The 800 nurses (1100 if Queen Mary's Hospital, Roehampton, is included) in the Westminster Group will be trained in the school. 180 students (to be increased to 200 or more) are admitted each year; and their course of training lasts twenty-seven weeks, spread over three years.

The architects are T. P. Bennett & Son.

NEW-STYLE MENTAL HOSPITAL

ON April 15 Mr. Enoch Powell, the Minister of Health, will formally open the hospital for mental defective patients which is being erected on Balderton Hall estate, two miles south of Newark. The project was begun by the Nottingham County Council in 1936, but building was delayed by the shortages of the war and post-war period. In 1948 the site and partly completed buildings were vested in the Minister of Health and plans were put in hand for a hospital of 952 beds. By 1957 the work was so far advanced that the first patients were admitted, and by the end of 1960 the first phase had been concluded at a cost of £1,082,400. It includes 6 villas, a hospital unit, male patients' workshops, power-house and ancillary premises, central kitchens, stores, dining and recreation building, laundry, male nurses' hostel, medical superintendent's house, and 35 staff houses.

After the Royal Commission on Mental Health had reported, ideas changed on the best size of hospital for subnormal patients, and the original plan for 952 beds was revised. To the 252 beds which are provided in the six completed villas, it is now proposed to add only a children's unit of 150 beds, and a low-grade section of approximately 180 beds. Because it is not the Minister's policy to carry out farming activities at hospitals, the estate has been reduced by leasing some 124 acres not immediately surrounding the hospital. The road works for the children's unit and ten additional houses have been completed; and work is now beginning on the three pavilions and a school for the children which should be finished by September, 1962. The rest of the hospital will include pavilions for low-grade patients, a female patients' training unit, a recreation hall, a nurses' home and training-school, further staff houses, garages, and non-resident staff changing accommodation. The total cost of the whole scheme will be almost £2 million.

PROTECTION CODE FOR IONISING RADIATION

A DRAFT code for the protection of factory workers from ionising radiation and other hazards from radioactive substances was published by the Ministry of Labour on March 30 as the Ionising Radiations (Sealed Sources) Regulations, 1961.[1] The regulations apply to all factories and other places covered by the Factories Act, 1937, and describe the precautions to be taken against ionising radiations from sealed sources and from machines which produce ionising radiation or in which particles are accelerated by a voltage of not less than 5 kV.

The maximum permissible dose of radiation is laid down, and the regulations stipulate that all persons exposed to radiation shall first receive appropriate instructions. "Adequate shielding" is defined, and provision is made for the regular medical inspection of workers at intervals not greater than fourteen months. No-one under 18 is to handle any source of radiation, or to work at any time unprotected by a shield.

Objections to the regulations must be sent to the Minister by June 9. If no serious objections are raised, some of the regulations will come into force within two weeks and the rest after six months. Contravention of them will then carry a penalty of up to £300, with an additional £15 for each day on which the offence continues after conviction.

1. H.M. Stationery Office. Pp. 16. 9*d*.

BY APPOINTMENT

IN general practice the tradition of the crowded room, the lengthy wait, and the sometimes hurried consultation has endured long and will die hard. The *Medical World* has taken a step to hasten its end by publishing a handbook on the establishment and running of appointment systems under different conditions of practice.[1] The advice given is based on the experience of seven practitioners who have introduced their own systems. Objections to this innovation are examined. These vary from dislike of novelty to fear that patients will disapprove and betake themselves elsewhere, or that emergencies will not be properly catered for. Each objection is answered convincingly, though it is admitted that in a large practice the system will depend for success largely on the personality of the secretary-receptionist. At present appointment systems in general practice are run by the few. An appointment system is likely to aid not only patients but the practitioner.

ADOPTION

THE third book[2] in a series published by the National Council for the Unmarried Mother and Her Child is written primarily for couples who are thinking of adopting a child. It gives information about how to do this, and also about what would-be adopters are likely to meet in their dealings with adoption societies, courts, and social workers. The booklet contains a brief historical account of the adoption of children in England, Wales, and Scotland with relevant abstracts from the Adoption Act of 1958. Many doctors will find it useful to keep a few copies to hand to patients seeking advice on adoption.

University of London

Dr. F. J. C. Roe, senior lecturer at the London Hospital Medical College, has been appointed to the readership in experimental pathology at the Institute of Cancer Research: Royal Cancer Hospital.

The title of reader in metabolic diseases has been conferred on Dr. C. L. Cope, in respect of his post at the Postgraduate Medical School of London, and of reader in experimental pathology on Dr. H. K. Weinbren, in respect of his post at the London Hospital Medical College.

On Feb. 22 the degree of M.D. was awarded to J. K. Wing.

University of Glasgow

Dr. J. H. Hutchison has been appointed to the Samson Gemmell chair of child health in succession to Prof. Stanley Graham, who will retire on Oct. 1.

Dr. Hutchison was educated at the High School of Glasgow and Glasgow University, graduating M.B. in 1934. He held hospital appointments in the Royal Hospital for Sick Children and the Western Infirmary, Glasgow, and St. Luke's Hospital, Bradford. From 1939 to 1945 he served with the R.A.M.C. in France, North Africa, Italy, and Austria, and in 1945 he was appointed O.B.E. Since 1947 he has been Leonard Gow lecturer in the diseases of infancy and childhood in the University of Glasgow, and visiting physician in charge of wards at the Royal Hospital for Sick Children. He is also assistant physician for infant ailments at the Royal Maternity Hospital and consultant pædiatrician to the Glasgow Eye Infirmary. He was elected F.R.C.P. in 1947. He has published papers on investigations into the iron metabolism of children in health and disease,

1. Appointment Systems in General Practice. Copies obtainable without charge from the *Medical World*, 55, Russell Square, London, W.C.1, or Lloyd-Hamol Ltd., 11, Waterloo Place, London, S.W.1.
2. Adoption and what it means: information series no. 3. 1961. Obtainable from the National Council for the Unmarried Mother and Her Child, 255, Kentish Town Road, London, N.W.5. 3*d*. per copy, 5*d*. post free.

collapse of the lung in children, and cretinism, juvenile myxœdema, and sporadic goitre.

Dr. T. C. White, a consultant dental surgeon under the Western Regional Hospital Board and head of the department of orthodontics at the Glasgow Dental School, has been appointed to the chair of orthodontics. Dr. Christina C. McEwan has been appointed lecturer in public health, and Dr. M. F. Smith lecturer in medical genetics.

Sir Russell Brock will give the Macewen lecture for 1961.

University of Dublin

The following have been awarded the diploma in gynæcology and obstetrics:

Ibrahim Eldessouki Ahmed Aboul-Magd, Usha Bajaj, Yudhishthir Vasudev Dave, E. J. T. Giblin, R. W. J. R. James, Nafees Jamal Koraishy, H. B. Miller, Sulochana Samuel.

University of Queensland

Mr. D. B. Leaming, first assistant in the department of surgery, King's College, Newcastle upon Tyne, has been appointed senior lecturer in surgery in the university.

Royal College of Physicians of Ireland

At a meeting of the college on March 24, with Dr. R. E. Steen, the president, in the chair, the following were admitted to the licence in medicine and midwifery:

M. J. Cox, H. A. Fenton, G. R. Gupta, T. J. E. Hynes, J. W. Laing, O. E. Mullen, K. S. Vig.

Royal College of Surgeons in Ireland

Fellowships have been conferred on G. M. Irvine (ad eundem) and Saad Morcos Abdel Messieh. Licences in surgery and midwifery have been conferred on the following:

M. J. Cox, Helen A. Fenton, Gulshan Rai Gupta, T. J. E. Hynes, J. W. Laing, Olive E. Mullen, K. S. Vig.

Royal College of Obstetricians and Gynæcologists

At a meeting of council on March 25, with Mr. Arthur Bell, the president, in the chair, the gift of a further £6000 from the Wellcome Trust, for library purposes, was announced.

Faculty of Radiologists

Sir Lawrence Bragg will give a Crookshank lecture on Friday, May 12, at 4.30 P.M., at the Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C.2. He will speak on the atomic architecture of protein molecules.

A postgraduate weekend course is to be held on May 13 and 14 at the Royal College of Surgeons. Further particulars may be had from the secretary of the faculty, 47, Lincoln's Inn Fields, W.C.2.

Hunterian Society

The subject for this society's 1961 essay competition is the management of diabetes mellitus in general practice. The competition is open to all general practitioners resident within the British Commonwealth. Further details may be had from Dr. O. Garrod, the hon. secretary, 31, Weymouth Street, London, W.1. The gold medal for 1960 has been awarded to Dr. Louis Freedman.

British Institute of Radiology

The annual congress of this institute will be held from April 26 to 28 at Central Hall and Church House, Westminster, S.W.1.

World Health Organisation

Dr. C. M. Norman-Williams, chief medical officer of Nigeria, has been appointed director of health services in the African regional office in Brazzaville. He will be the first senior officer under the regional director.

New Mental Hospital in Hong Kong

This week Sir Robert Black, the governor of Hong Kong, is opening a 1000-bed hospital for mental patients at Castle Peak.

It consists of ten blocks of buildings, including administrative offices, ward units, a social centre, and a services block. There are a 120-bed ward for drug-addiction cases, laboratories, an operating-theatre, and treatment rooms. All the wards have their own gardens, and the blocks are linked by coloured covered ways. The Government architects responsible for the design have sought to provide bright and cheerful colour schemes.

French Film Prize

The annual prize of the *Presse Médicale* for the best medical or surgical foreign film has been awarded this year to *The Story of Oxytocin* which was made under the direction of Prof. W. C. W. Nixon of University College Hospital, London, in collaboration with Dr. C. N. Smyth and Dr. G. W. Theobald, and with the cooperation of the Sandoz Laboratories.

Lord Cohen of Birkenhead has been elected president of the National Society for Clean Air, in succession to Sir Hugh Beaver.

Mr. G. A. Mitchell has been appointed chairman of the board of governors of Queen Charlotte's and Chelsea Hospitals.

Lord Adrian has left for a British Council sponsored visit to Poland at the invitation of the Polish Academy of Sciences.

Dr. W. S. C. Copeman will lecture on Tudor medicine at the University of California as exchange professor of medical history during the spring of 1962.

A meeting of the Southern Region of the Association of Clinical Biochemists will be held on Saturday, April, 15, at the Radcliffe Infirmary, Oxford.

CORRIGENDUM: *General Practice*.—We regret that we misinterpreted the last paragraph of Dr. O'Neill's letter (March 25, p. 675). It should have read: "My suggested reform would be to stop the allocation from the Central Pool of grossly disproportionate payments, whereby a general practitioner on the Maternity List, with 100 midwifery cases a year on his books, is paid for this service the same fee as a non-maternity general practitioner with a list of 3000 is paid for looking after 1260 patients 365 days a year."

Diary of the Week

APRIL 9 TO 15

Monday, 10th

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. B. G. B. Lucas: Drink, Drugs, and Anæsthesia.

Tuesday, 11th

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1
5 P.M. Prof. L. J. Witts: Aspects of the Pathology of Anæmia. (First of two Lumleian lectures.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. J. K. Ross: Fate of Autogenous Tissue Grafts in the Heart. (Hunterian lecture.)

UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Dr. Felix Wroblewski (New York): Diagnostic Biochemical Dissection.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Psychiatry*. Dr. Valerie Cowie: Children of Psychotics—a Controlled Study.
8.30 P.M. *Orthopædics*. Dr. Marshall Urist: Multiple Stage Leglengthening: Report of a Case of Chondrodysplasia with a Surgical Increase of Ten Inches.

WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY, 91, Dean Street, W.1
5.30 P.M. Mr. G. C. Knight: Surgical Treatment of Cervical Spondylosis.

Wednesday, 12th

ROYAL SOCIETY OF MEDICINE
4.30 P.M. *Physical Medicine*. Dr. R. W. Windle: Action of U.V.L. on Bacteria in Medicine and Industry. (Presidential address.)
5.30 P.M. *Library* (*Scientific Research*). Dr. Austin Smith (president of the Pharmaceutical Manufacturers' Association in the U.S.A.): Use of Knowledge.

ROYAL FREE HOSPITAL, Gray's Inn Road, W.C.1
4 P.M. Dr. John Higginson (Kansas City): Cirrhosis: Comments on Ætiology.
5.15 P.M. Dr. Wroblewski: IBM (computer) Diagnosis.

MIDLAND MEDICAL SOCIETY
8.30 P.M. (Birmingham Medical Institute, 36, Harborne Road, Edgbaston) Mr. N. L. Crabtree, Mr. R. S. Strang: Treatment of Deafness.

Thursday, 13th

ROYAL COLLEGE OF PHYSICIANS OF LONDON
5 P.M. Professor Witts: Aspects of the Pathology of Anæmia. (Second of two Lumleian lectures.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Mr. T. J. Butler: Effect of Gastrectomy on Pancreatic Function in Man. (Hunterian lecture.)

ALFRED ADLER MEDICAL SOCIETY
8 P.M. (11, Chandos Street, W.1.) Dr. Peter Tarnesby: Use of Hypnosis in Psychotherapy.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY
8.30 P.M. (Royal Society of Arts, Adelphi, W.C.2.) Colonel Robert Henriques: The Expression of Experience. (Cavendish lecture.)

Friday, 14th

MIDLAND CENTRE FOR NEUROSURGERY, Holly Lane, Smethwick, Birmingham
8 P.M. Mr. G. F. Rowbotham: Circulations of the Brain with their Surgical Implications.

PLYMOUTH MEDICAL SOCIETY
8.30 P.M. (North Friary House.) Prof. J. H. Burn: Hypotensive Drugs.